TECHNOLOGY DEPT.

JULY 1950

The Paper Industry

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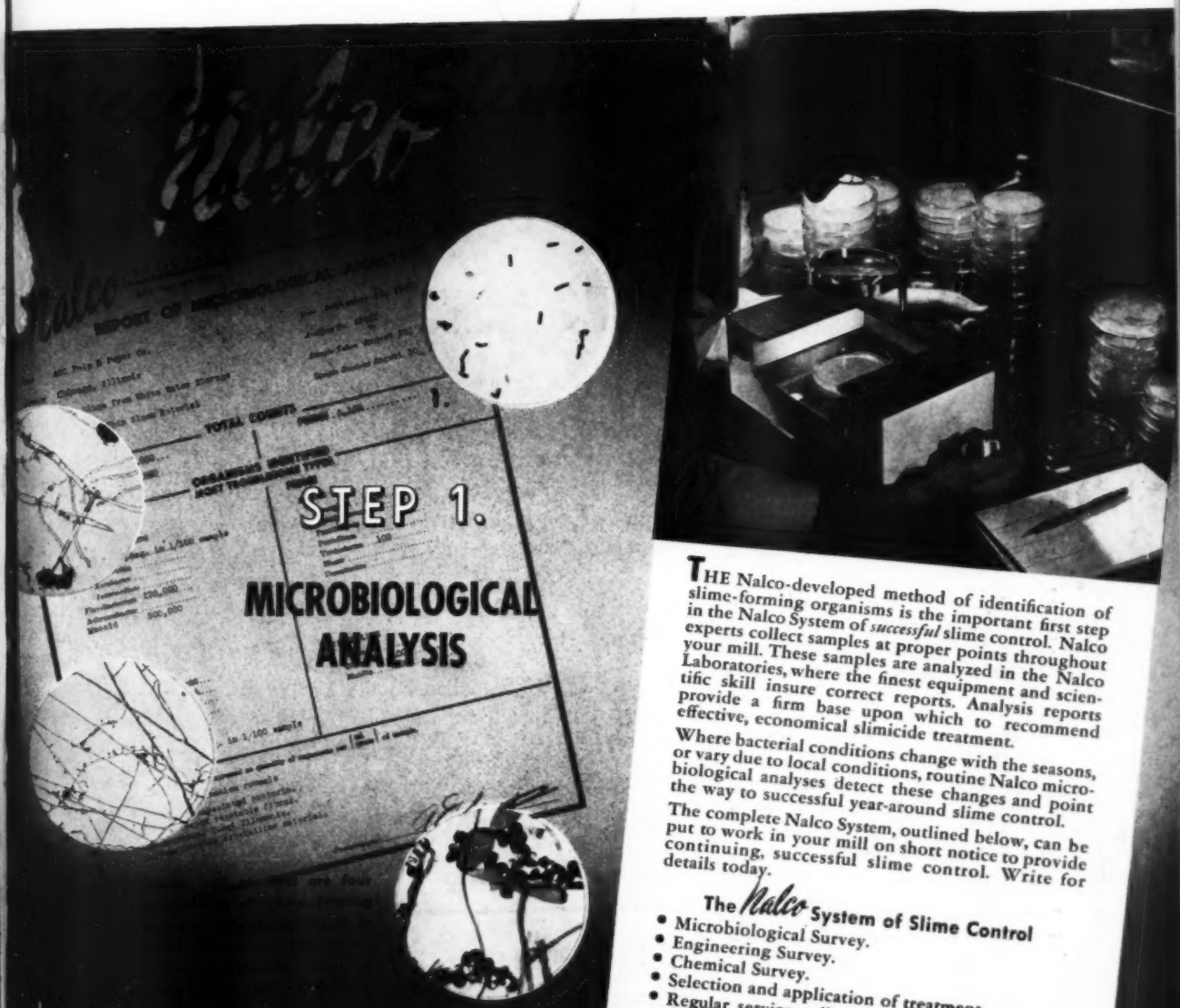
DETROIT



THE Nalco-developed method of identification of slime-forming organisms is the important first step in the Nalco System of *successful* slime control. Nalco experts collect samples at proper points throughout your mill. These samples are analyzed in the Nalco Laboratories, where the finest equipment and scientific skill insure correct reports. Analysis reports provide a firm base upon which to recommend effective, economical slimicide treatment.

Where bacterial conditions change with the seasons, or vary due to local conditions, routine Nalco microbiological analyses detect these changes and point the way to successful year-around slime control.

The complete Nalco System, outlined below, can be put to work in your mill on short notice to provide continuing, successful slime control. Write for details today.

The Nalco System of Slime Control

- Microbiological Survey.
- Engineering Survey.
- Chemical Survey.
- Selection and application of treatment.
- Regular service calls, routine analyses, and mill checks.

NATIONAL ALUMINATE CORPORATION
6232 W. 66th Place • Chicago 38, Illinois
Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario, Canada

Nalco

THE FUTURE OF YOUR PRODUCT IS IN THESE HANDS

wet-strengthen your paper with the

UFORMITE resins

Who gets the blame when your customers' customers complain about paper bags that burst when wet? And who loses business?

The cheapest and simplest way to make better paper, and to safeguard and widen your markets, is to wet-strengthen your paper *now* with the UFORMITE resins. The cost is low—only $4 per ton of paper. Results may astonish you—wet Mullen values up 300%, dry Mullen and fold values increased 10% to 30%, better wet rub and scuff resistance, and wet and dry tensile. All without pretreatment, special equipment or special processing.

Full technical information on the UFORMITE resins for wet-strength is yours for the asking. If you make bags, towels, reproduction or printing papers, glassine, grease-proof wrappings, or twisting tissues, get the facts today.

OTHER CHEMICALS FOR THE PAPER INDUSTRY

RHOZYMES BB and E-5—for enzyme conversion of starch.

TAMOL N—for effective pitch control—a dispersing agent for pigments.

TRITONS—Surface-active agents with a score of uses in paper manufacture—defoaming, absorbency control, in caustic cooking of cotton fiber, as a dispersing agent for pigments and metallic soaps, emulsion-type coatings.

The Hydrosulfites—Reducing agents for stripping color from rag stock or for bleaching pulp.

HYAMINES—Deodorants for paperboard and glue bactericides.

UFORMITE, RHOZYME, TAMOL, TRITON, HYAMINE *are trademarks, Reg. U.S. Pat. Off. and in principal foreign countries*

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

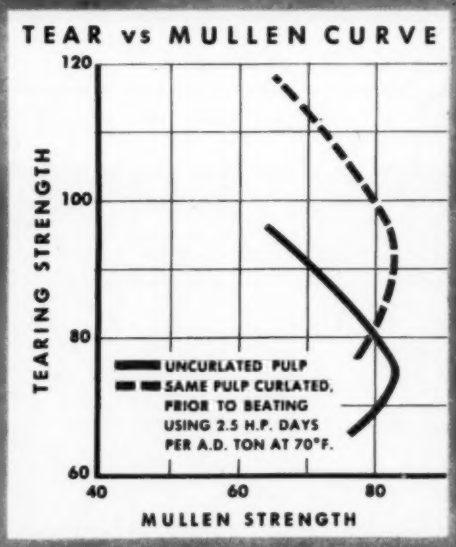
THE RESINOUS PRODUCTS DIVISION

Washington Square Philadelphia 5, Pa.

The Resinous Products Division was formerly The Resinous Products & Chemical Company

Curlators Are Proving Their Value

Effect of Curlation prior to beating on the tear-mullen relationship during beating of a previously undried northern unbleached sulphite pulp.



TEST DATA

	HP/DT*	FREENESS	MULLEN	TEAR	DENSO-METER
UNCURLATED PULP	0	840	66.8	93	13
	1	810	77.6	83	34
	2	764	80.8	77	95
	3	672	84.0	75	260
	4	615	81.5	74	580
	5	521	70.8	60	1330
	7	394	66.5	55	3750
	9	285	64.6	54	5660
PREVIOUSLY CURLATED PULP					
	0	836	66.2	117	3
	1	770	82.8	95	22
	2	688	80.2	81	125
	3	575	76.8	72	360
	5	390	71.7	67	2640
	7	270	55.0	48	8280

*H. P. DAYS PER A. D. TON SPENT IN BEATING ONLY.

Note: Tear at maximum mullen of uncurlated pulp is 75, of curlated pulp 95.
Description of testing procedures employed by the Curlator Corporation laboratory will be provided upon request.

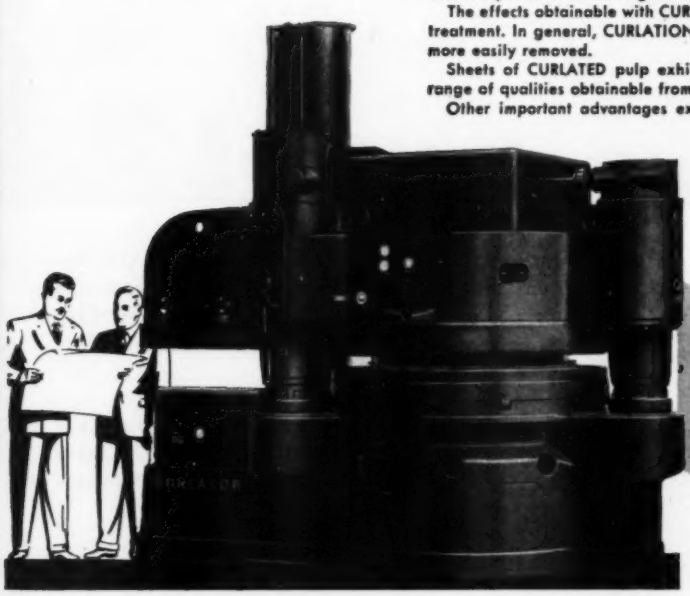
CURLATION is a new mechanical process for improving pulp properties, fully tested and thoroughly proved. Curlation not only produces a permanent change in the shape of pulp fibres, but also exerts a powerful de-shiving action, with negligible change in freeness.

The effects obtainable with CURLATION vary widely with the raw material and the conditions of treatment. In general, CURLATION tends to produce an easier beating pulp from which water is more easily removed.

Sheets of CURLATED pulp exhibit a more even textured matte appearance. In addition, the range of qualities obtainable from a given pulp is broadened.

Other important advantages exist . . . WRITE for new bulletin C-2 on the C-50 CURLATOR.

The CURLATOR is a tool for altering the properties of pulp and paper to obtain qualities hitherto unavailable by mechanical means. The effects of CURLATION vary with the raw material and may be described only in relation to a particular pulp.



CURLATOR† Corporation

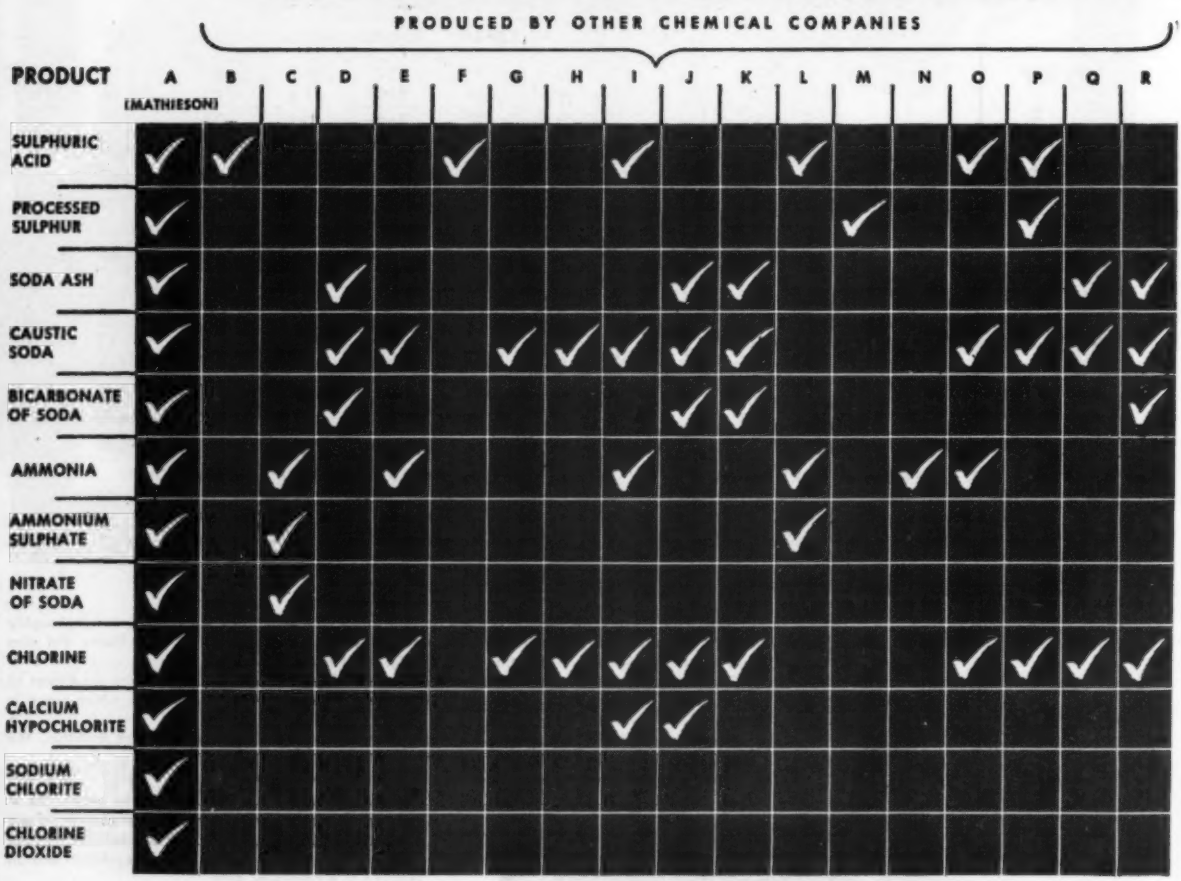
565 BLOSSOM ROAD · ROCHESTER 10, NEW YORK

†T. M. Reg.—Curlator Corporation, Rochester, N. Y.

12 BASIC CHEMICALS

ALL *produced by*

MATHIESON



This inclusive selection of basic chemicals—all available from one reliable source of supply—enable Mathieson customers to simplify their purchasing procedures. They benefit further by obtaining chemicals of outstanding purity.

These are but two of the many specific reasons it will pay you to check with Mathieson before ordering any heavy chemical. Mathieson Chemical Corporation, Mathieson Building, Baltimore 3, Maryland.

Mathieson CHEMICALS

8335

SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 32 • NUMBER 4 • JULY, 1950

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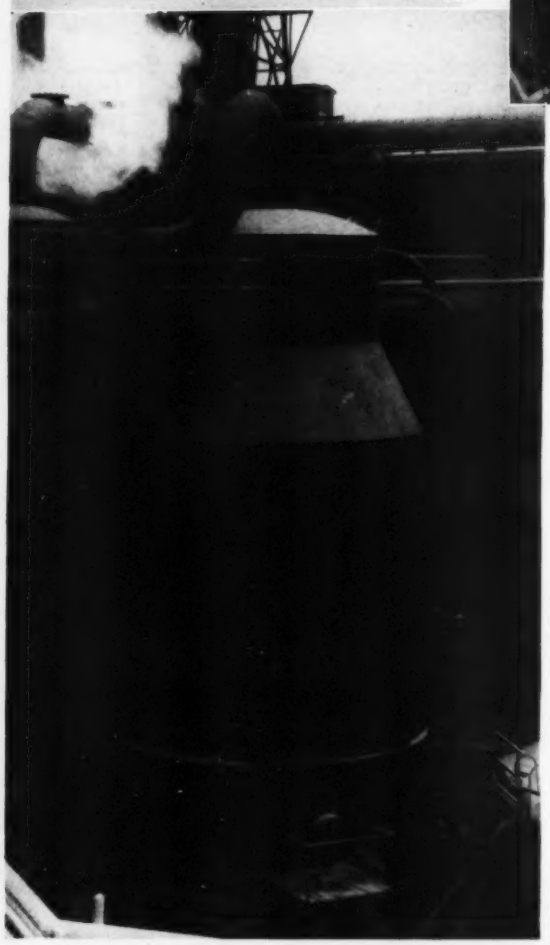
1950 paper demand is steadier—heavier*

You will need Modern Equipment to meet it...



**Quotation from the editorial "What's Ahead" in the May, 1950, issue of* The Paper Industry.

With market authorities predicting a paper consumption for 1950 of from 24 to 28.5 million tons, it's wise to take a critical look at your storage tanks, processing vessels, and other production facilities. Does it make good business sense to "get-by" with obsolete equipment when many companies are planning to meet increased demands with long-range *expansion* programs?

For example, the St. Mary's Kraft Corporation recently expanded the pulp producing capacity of its mill at St. Mary's, Georgia, from 250 to 500 tons per day—an increase of 100 per cent. Naturally, this required a great deal of *modern equipment*—much of it consisting of Horton steel plate structures built by Chicago Bridge. In addition to the equipment shown, we furnished eight digesters, a 15,000-bbl. fuel oil tank, a chip tank, a salt cake tank, and a lime storage tank.

Plan now to take advantage of skyrocketing demand for paper by installing *modern equipment* to increase your capacity and at the same time lower operating costs. When you decide to expand or modernize, consider the services we offer the paper industry. Our shops do welding, x-raying and stress-relieving to code requirements. Corrosion-resistant linings can be furnished and our five plants are located to give you prompt service.

Write our nearest office for quotations on the storage tanks and other steel plate structures you will need.

Horton structures installed in connection with the expansion of the St. Mary's Kraft Corp. mill at St. Mary's, Ga., include (above) liquor storage tanks and (left) a 20 ft. diam. by 20 ft. blow tank.

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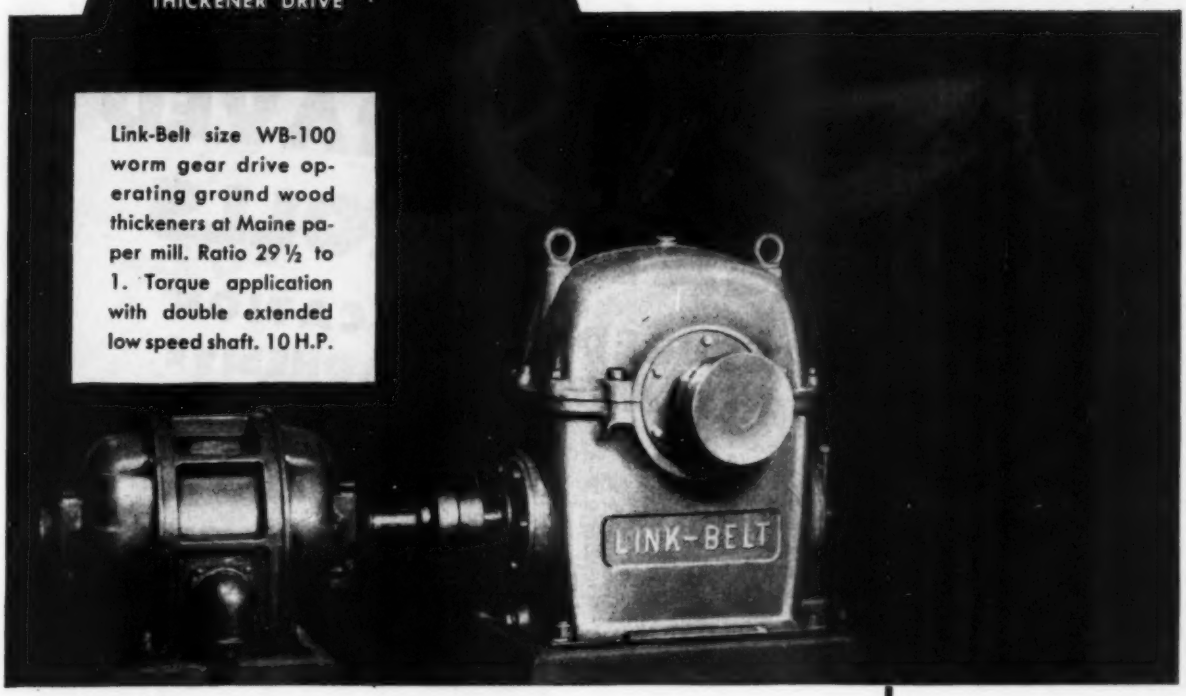
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.

GROUND WOOD
THICKENER DRIVE

Link-Belt size WB-100 worm gear drive operating ground wood thickeners at Maine paper mill. Ratio 29½ to 1. Torque application with double extended low speed shaft. 10 H.P.



Look to LINK-BELT for 3 ways to solve your speed reduction problems

There are various considerations in the selection of proper units for speed reduction. Is it ratio? Is it space? Is it shaft position? Is it shock loads?

Whatever it is—LINK-BELT'S complete line of enclosed gear drives gives you the exact answer to your needs.

Our engineers advise you without being limited to an incomplete line. Their advice is yours without obligation.

Link-Belt worm gear drive.

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Ask for Books 2247, 1819, 1824 for the complete answer to your speed reduction problems.

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LINK-BELT enclosed gear drives

LINK-BELT COMPANY Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices, Factory Branch Stores and Distributors in Principal Cities.

Engineered

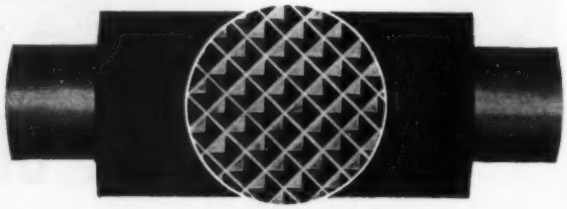
PRECISION ENGRAVED APPLICATOR ROLLS

FOR MEASURED APPLICATION OF COLOR, PLASTIC OR ADHESIVE

Precision engraving of Applicator Rolls is the result of years of scientific research by experienced technical people with a wide knowledge in measured application of color, plastic and adhesive. Our mechanical process of engraving insures uniform depth which determines the amount of color or coating to be applied. The pre-determined depth of each cell in any pattern is identically the same, regardless of the number per square inch, or the size of the roll.

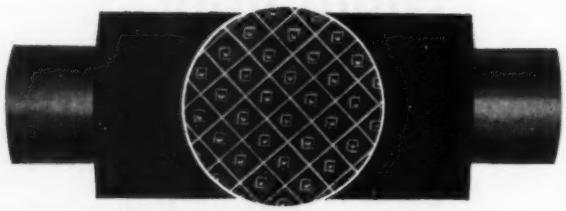
PYRAMID SHAPE CELL

Most generally used for light and medium application of color or coating on aniline or offset printing machines, where the color or coating is applied to a rubber mat, offset or transfer roll without the use of a doctor blade.



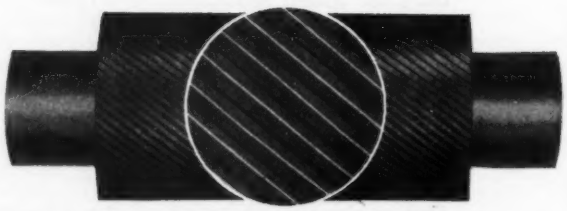
QUADRANGULAR SHAPE CELL

Basically a gravure type cell, best suited for coloring or coating on Intaglio or gravure machines, or any other direct application equipment using a doctor blade. The uniform size and depth of the cells in each pattern determines the weight of the material applied. There is a pattern available for almost any direct application.



TRIANGLE-HELIX SHAPE CELL

This scientifically engineered cell is used for heavy application of color and coating, on machines employing a doctor blade. The Triangle Helix Shape Cell has solved many complicated coating and coloring problems, and produces a uniform coverage.



The density and percentage of solids in any coloring or coating material, plus the measured dry weight of solids to be applied, determines the correct pattern for each application. Our complete engineering service is yours for the asking.

PIONEER PRODUCERS OF PRECISION ENGRAVED APPLICATOR ROLLS

MODERN ENGRAVING & MACHINE CO.

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Speed PRODUCTION Reduce OPERATING COSTS

More and more leading paper mills are using Yarway Motor-Operated Digester Valves on the blow lines from pulp digesters to blow tanks.

Economy and speed of operation are two main reasons.

The famous Yarway *Seatless* principle assures a *tight* valve—effectively sealing off the digester, preventing loss of black liquor, increasing number of cooks per day. The simple push button motor control at top of digester means speed.

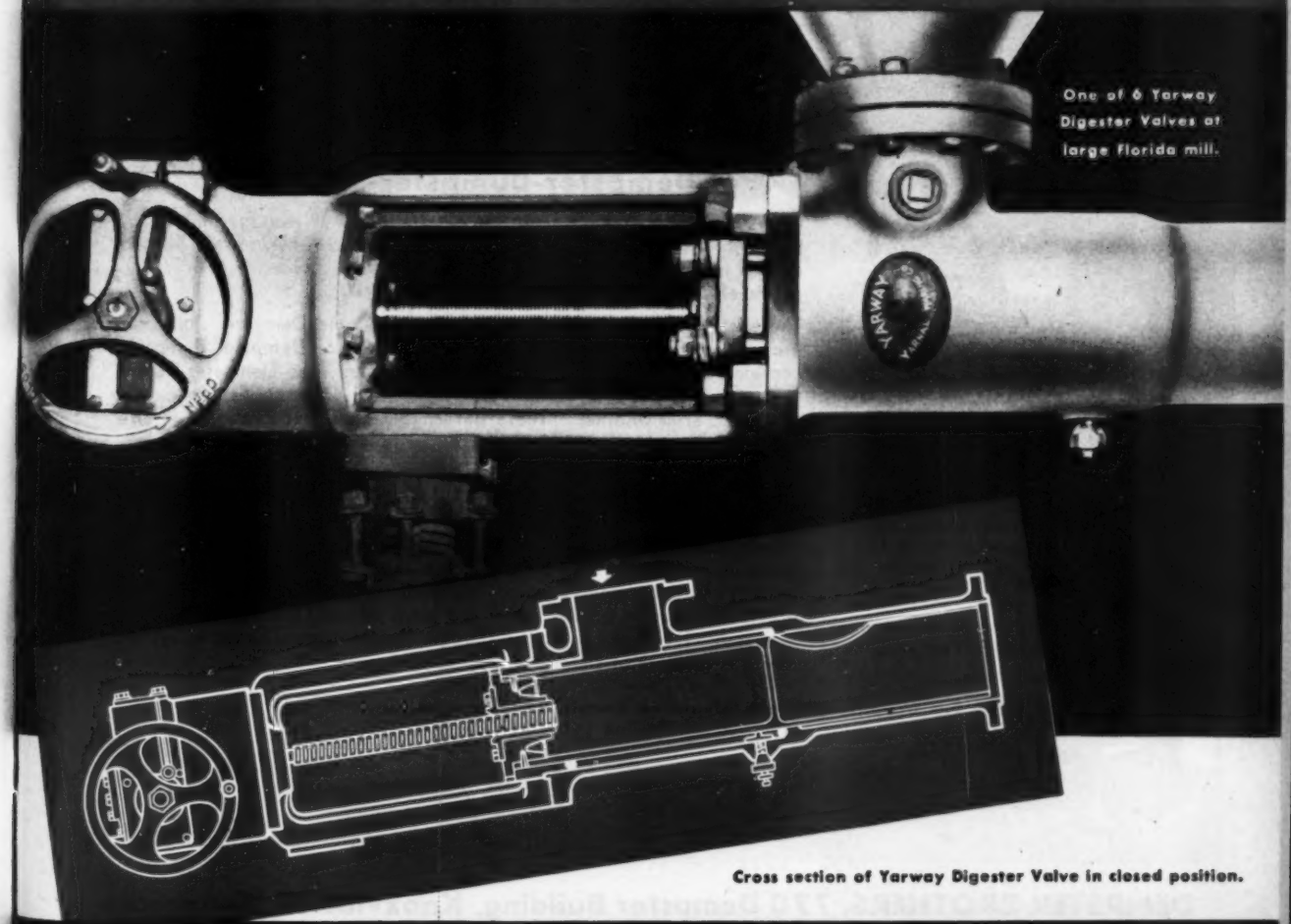
Metallurgical advancements also permit Yarway Digester Valves to withstand the pressure, shock and chemical action always encountered in this service.

In one mill, Yarways increased production 1½ to 2 cooks per day while reducing operating supervision. Another reports maintenance is lower than on any other type of valve for this service.

WRITE FOR NEW CATALOG NO. 440

YARNALL-WARING COMPANY
149 Mermaid Avenue, Philadelphia 18, Pa.

WITH YARWAY *SEATLESS* DIGESTER VALVES



One of 6 Yarway Digester Valves at large Florida mill.

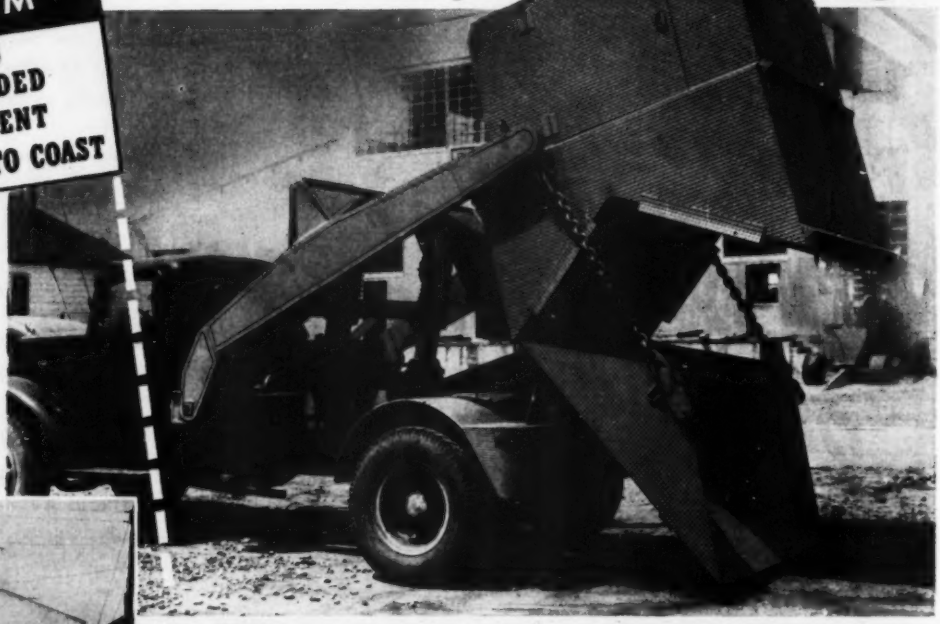
Cross section of Yarway Digester Valve in closed position.

YARWAY BLOW-OFF VALVES

★ DEMPSTER DUMPSTER SYSTEM

SERVING COST-MINDED MANAGEMENT FROM COAST TO COAST

. . . handling bulk materials of every description at phenomenal savings



Photos show the three simple stages of servicing a container. The Dempster-Dumpster, operated from hydraulic controls by driver in the cab, picks up each container and hauls it to point of disposition where it may be dumped or set down intact.

★ GULF – *recognized across the nation*

. . . Gulf Oil Corporation, well known for sound management, uses the Dempster-Dumpster System

Gulf Oil Corporation is among the hundreds of well managed manufacturers, both large and small, who use the Dempster-Dumpster System of bulk materials handling . . . the system recognized across the nation for its efficiency and ability to reduce costs.

There is never an idle moment for a truck mounted Dempster-Dumpster around a manufacturing plant. With a variety of Dempster-Dumpster containers spotted inside and outside your plant, one Dempster-Dumpster, with only one man, the driver, is kept busy servicing one pre-loaded container after another. These detachable containers, ranging in size up to 12 cu. yds., carry pay-loads equal to conventional truck bodies. They are built in a wide variety of designs best suited to the type of materials handled—be they bulky, light or heavy . . . solids or liquids . . . trash or rubbish.

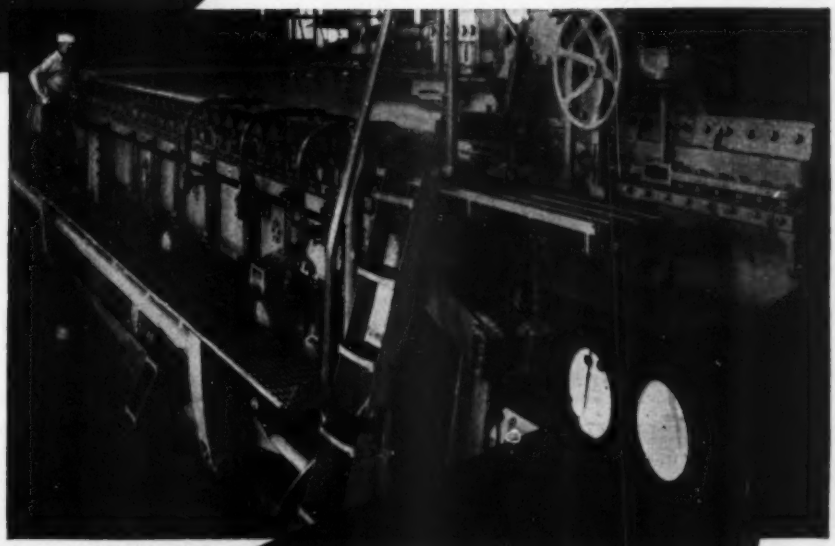
In addition to amazing increases in man-power efficiency . . . greatly reduced investment, and maintenance costs, the Dempster-Dumpster System improves "housekeeping" methods . . . reduces fire hazards . . . provides an easier, quicker, safer and more efficient manner of handling materials. It will pay you to investigate the Dempster-Dumpster System now! A product of Dempster Brothers, Inc.

One Dempster-Dumpster Services All Containers. . . All Designs. . . All Sizes

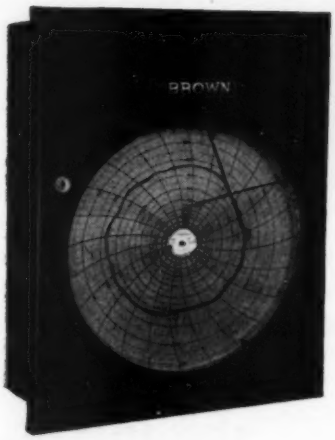
DEMPSTER BROTHERS, 770 Dempster Building, Knoxville 17, Tennessee

BROWN SPECIALIZED INSTRUMENTATION
IS KEEPING PACE WITH PAPER INDUSTRY
MANUFACTURING TECHNIQUES!

from Screen Room
to Paper Machine . . .



Courtesy St. Regis Paper Company



with Brown Level Measu[illegible]ems

INCREASINGLY aware of the vital importance of liquid level measurement and control, most paper men are exercising the utmost care in their selection of instrumentation, and many modern mill operators are standardizing on Brown Instrumentation . . . for higher quality . . . uniform production . . . reduced maintenance . . . and simplified control of entire processes.

There are three significant factors contributing to the outstanding performance of Air-Purge Systems, typical of Brown level measuring systems for the Paper Industry: (1) no clogging, (2) positive pen torque assures continually accurate pen positioning—no need to "tap" instrument for a dependable reading, and (3)—like all Brown Instruments—they are backed by the nationwide Honeywell Organization, ready to serve you no matter where your mill is located.

Brown Specialized Instrumentation includes a complete line of instruments, function-fitted to specific mill applications. For more detailed information, call in your local Honeywell Engineer . . . he is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4489 Wayne Ave., Philadelphia 44, Pa. Offices in more than 80 principal cities of the United States, Canada, and throughout the world.

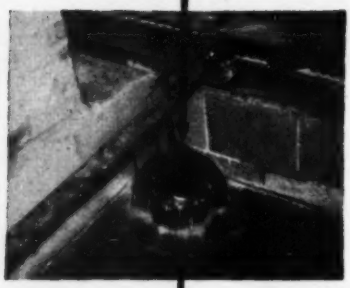
FOR THE PAPER INDUSTRY

Honeywell
BROWN INSTRUMENTS

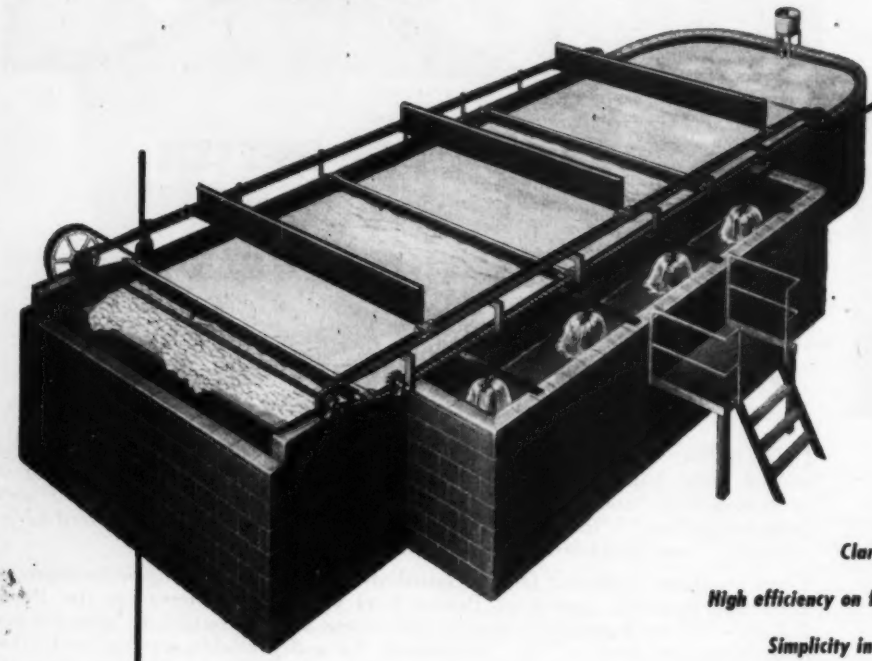
no stream pollution here!

SVEEN PEDERSEN
FLOTATION
SAVEALL

Clarifies water to such an extent that effluent contains less than two-tenths of a pound of filterable solids per 1,000 gallons.



One of the outlet tube discharges



OTHER ADVANTAGES:

Rapid return of recovered fibers.

Clarified water usable in many places.

High efficiency on free, slow, or filled stock furnishes.

Simplicity in cleaning due to open construction.

Low maintenance costs—no screens, few moving parts.

Relative insensitivity to fluctuation in quantity of incoming white water.

Write for this FREE brochure

BULKLEY, DUNTON PULP CO., INC.
295 MADISON AVENUE, NEW YORK 17, N. Y.

In Canada: **ALEXANDER FLECK, LIMITED**
416 WELLINGTON STREET, OTTAWA, ONTARIO

VESSEL DIVISION

NEWS

A.O. Smith 76th ANNIVERSARY 1874 - 1950

A.O.Smith

CORPORATION

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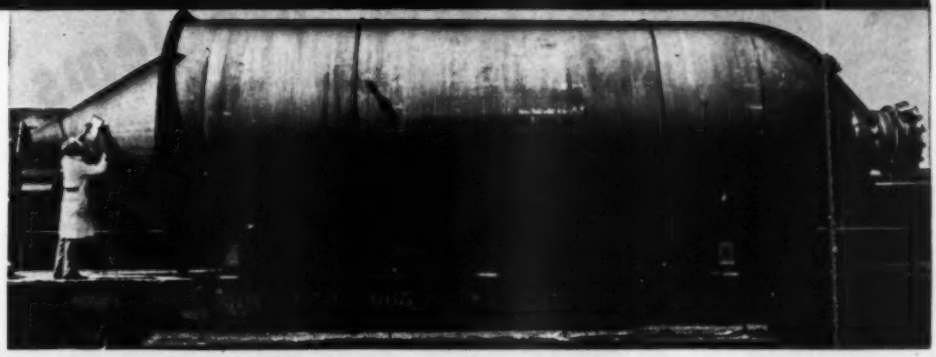
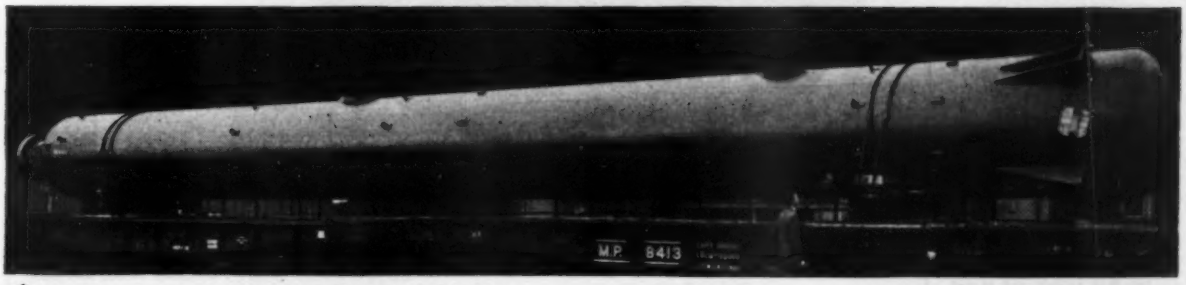
Los Angeles 14 • New York 17 • Philadelphia 3 • Pittsburgh 19
Salt Lake City 1 • Seattle 1 • Tulsa 3 • Washington 6, D.C.
International Division: Milwaukee 1

VESSEL LIFE INSURANCE. Before this SMITH-lined Paper Mill Digester was manufactured, an extensive and comprehensive testing program was completed to be sure the proper alloy lining was selected for the corrosive service. An experimental digester was built and a great many "cooks" were run before the final decision was made.





USING A. O. SMITH MULTI-LAYER CONSTRUCTION WAS MORE ECONOMICAL than single-plate construction in the manufacture of this 72 in. dia. by 80 ft. long water scrubber, at the same time providing a safer construction.

FIELD ASSEMBLY COSTS CUT TO A MINIMUM. The SMITHway is to do the maximum amount of work possible in the shop on vessels too big to be shipped in one piece. All the shell courses on this 15 ft. dia. by 113 ft. long A. O. Smith Atmospheric Tower were tacked together in the shop to get more accurate and complete installation of the internals.

CONSISTENT QUALITY OF A. O. SMITH ELECTRODES used in the manufacture of A. O. Smith Pressure Vessels is preserved by meticulous control procedures. By means of this X-ray diffraction machine, all raw materials used in electrode coating are checked for the presence of any foreign materials or impurities.

A. O. Smith Corporation, Dept. PI-750, Milwaukee 1, Wisconsin

Without obligation, send us the latest A. O. Smith Vessel Bulletins:

- ☐ V-44: Field Assembly of Pressure Vessels
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- ☐ V-52: Multi-Layer Vessel Manufacture and Assembly

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FROM THE WET END TO THE DRY

the "little" problems are solved by

DOWNINGTOWN AUXILIARIES

PUMPS for all purposes, including chest circulation

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SHAKE UNITS maintain their setting, and do not require continuous adjustment

SUCTION BOXES —bronze or stainless steel, stationary or oscillating, for felt or wire

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VALVES—rotary, non-clogging, regulating type, cast iron or bronze

DOCTORS —recommended for all troublesome locations

Our large staff of research and development engineers is constantly working to solve the individual production problems of the paper industry. Testing their ideas in the pilot plant at Downingtown under actual mill conditions, these men are answering the "little" questions that often mean over-all profit or loss.

Send us your own problems—great or small.

DOWNINGTOWN MANUFACTURING COMPANY

DOWNINGTOWN, PA.

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DESIGNERS AND BUILDERS OF PAPER MAKING MACHINERY SINCE 1880

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For any valving requirement, you can specify OIC Valves and be sure of efficient, precise control. That's because OIC Valves are:

PRECISION ENGINEERED—positive closure . . . minimum friction . . . designed for smooth, free flow of air, gases and liquids.

PRECISION BUILT—every essential part accurately finished for a precise fit, on the most modern production equipment.

PRECISION APPLIED—OIC engineers always available to help you select valves best suited to each job, at lowest cost.

Here's a three-way combination that provides "*precision valve*" *equipment* in your plant. First costs and upkeep costs are lower. See your local OIC distributor, or write us direct. Ask for a free copy of the 1950 OIC Valve Cross-Reference Chart. The Ohio Injector Company, Wadsworth, Ohio.

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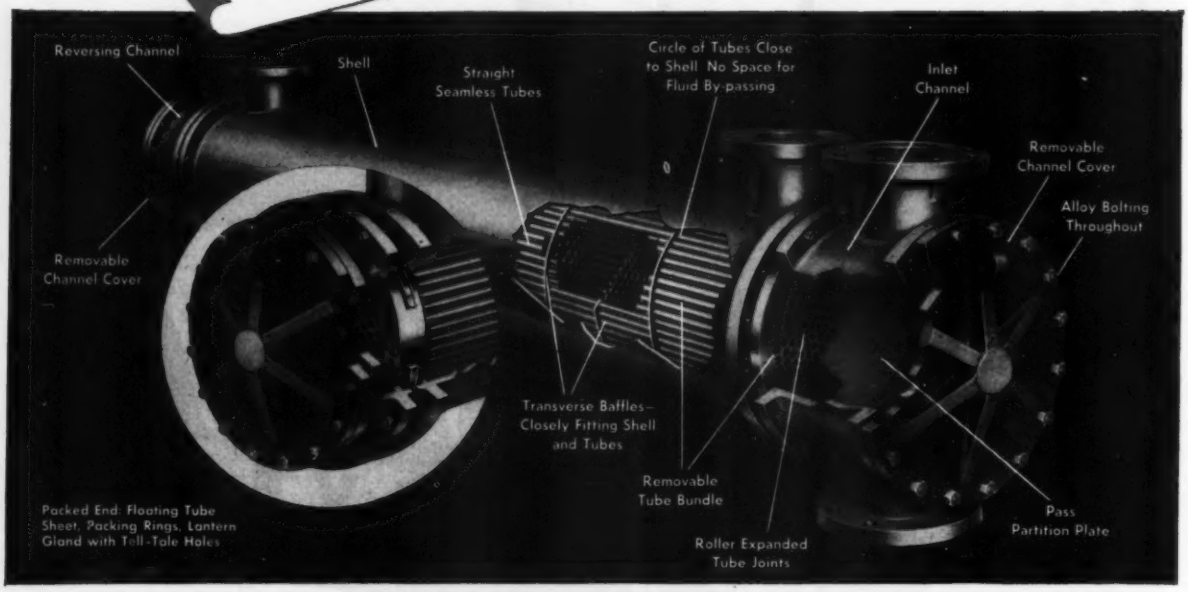
FOUNDED 1883

VALVES

FORGED AND CAST STEEL · IRON · BRONZE

now a smaller exchanger to handle a larger volume


Reversing Channel
Shell
Straight Seamless Tubes
Circle of Tubes Close to Shell No Space for Fluid By-passing
Inlet Channel
Removable Channel Cover
Alloy Bolting Throughout
Removable Channel Cover
Transverse Baffles—Closely Fitting Shell and Tubes
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Roller Expanded Tube Joints

Ross Research Reduces Size-Cost Requirements For Many Installations

For years, one of industry's most widely used, removable bundle exchangers, Ross Type CP now offers still more heat transfer capacity without increase in size.

As a result, it is possible in many instances for a smaller, less costly exchanger to handle a volume formerly calling for a larger unit.

MORE TRANSFER SURFACE — INCREASED TRANSFER RATE

A new tube layout, incorporating an added circle of tubes close to the shell (in the space so frequently left open in conventional designs) not only increases surface, but improves flow characteristics. Moreover, new techniques achieve closest possible clearances with utmost accuracy and uniformity, adding substantially to heat transfer rate.

LOW FIRST COST — QUICK DELIVERY

Add savings in space and cost, to the already well known benefits of low purchase price and quick delivery made possible through standardization and stocking of parts, and it's easy to see why Ross Type CP, now more than ever, is industry's leading removable tube bundle type exchanger.

FREE CATALOG

Get details on these and other famous Ross features such as easy-to-clean, straight tube design . . . wide latitude of connection locations . . . ease of installation . . . in new file-size Bulletin 2.1K1. Write.

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ROSS

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Hooperwood's method of calendering the new S/AA Dryer Felt eliminates all protruding fibres so paper stock will not adhere to the felt and cause it to "fill up." Also the exceptionally smooth, twill-like surface will not mark the sheet.

These advantages are but two of many which S/AA offers. Mill men also like the blend of asbestos and cotton fibre which gives S/AA felts heat resistance *plus* absorbency. Good drainage is afforded by all asbestos surface warps weaving directly through the felt.

Important, too—high tensile yarns give longer life, lower dryer felt cost per ton.

Today, write for a sample of S/AA.

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taste-appeal...

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8217

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Subsidiary of NATIONAL LEAD COMPANY

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American *DiesELectric*★

Locomotive Cranes

"Do twice the work at half the cost!"

They think in big figures, at Minnesota and Ontario Paper Company. When they proved to themselves that American 40-Ton DiesELectric Locomotive Cranes cut fuel costs in half, and doubled work output per crane, they saw *big savings* involved.

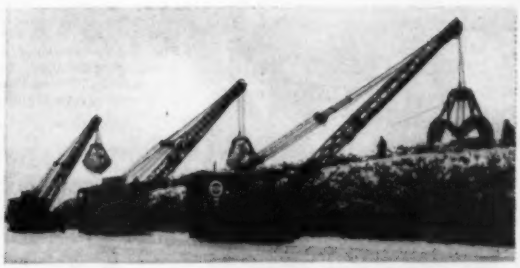
As a result, Mando is now replacing all steam cranes with swift, efficient American DiesELectrics . . . one for two. Each of the new machines handles about 30 carloads of wood on an 8-hour shift. One man runs each crane. There is no time out for steaming up, or for coal or water stops.

Do these figures make yours look out of date? Mail the coupon below, for facts on *modern* material handling.

★Diesel-Electric Locomotive Crane Patent No. 2083460. Touch Control Patent No. 2370856.

FAST AND VERSATILE, these cranes handle car switching and many other jobs. This one is installing a 30-ton turbo-generator.

250,000 CORDS of pulpwood in the world's largest pulpwood storage facility. Mile-long yard contains 42 storage ranks, 20 feet high, served by both truck and rail cars.



THREE DO THE WORK OF SIX! The American 40-Ton DiesELectric shown here are doing work of six steam cranes. Each "bite" moves about three tons of wood. The 50 and 55 foot booms make a simple task of piling the pulpwood to a height of 20 feet.

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& DERRICK COMPANY

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Company_____

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41

Do it the EASY way — *Standardize on* POWELL VALVES

When you get your valves from various sources, buying for replacement—and stocking spare valves and parts—becomes unnecessarily complicated.

But when you buy ALL your valves—Bronze, Iron, or Steel, and, if you need them, Corrosion-Resisting Valves—from ONE source, you have the answer to your flow control problems. Powell makes them all* and makes them better. Also Powell makes the *only* COMPLETE Line of Valves for Corrosion-Resistance available to Industry today.

Fig. 1847—200-pound Stainless Steel Swing Check Valve with screwed-in cap and regrindable, renewable disc.

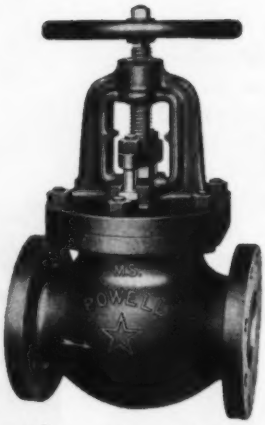


Fig. 241—Large 125-pound Iron Body Bronze Mounted Globe Valve. Sizes 2" to 16", incl. Has outside screw rising stem, bolted flanged yoke and regrindable, renewable bronze seat and disc.

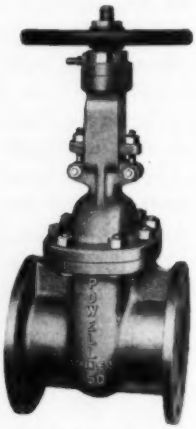
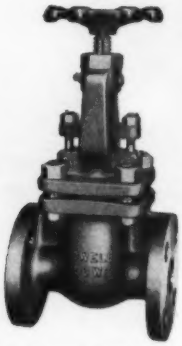


Fig. 2453-G—Standard 150-pound Stainless Steel Gate Valve with flanged ends, outside screw rising stem, bolted flanged yoke-bonnet and tapered solid wedge.



New 150-pound Gate Valve with flanged ends, outside screw stem and yoke, bolted flanged bonnet. Face to face dimensions conform to MSS SP42. **Fig. 2471** — Available in 18-8S, 18-8S Mo, Durimet "20". **Fig. 2473** — Available in Nickel, Monel Metal, Ampco Alloy, Everdur, Hastelloy Alloys A-B-C. These valves are also available with screwed ends.

New 150-pound Globe Valve with screwed ends, outside screw rising stem and yoke, and bolted flanged bonnet. **Fig. 2474** — Available in 18-8S, 18-8S Mo, Durimet "20". **Fig. 2476** — Available in Nickel, Monel Metal, Ampco Alloy, Everdur, Hastelloy Alloys A-B-C. Flanged end valves are furnished with face to face dimensions conforming to latest MSS Standards.

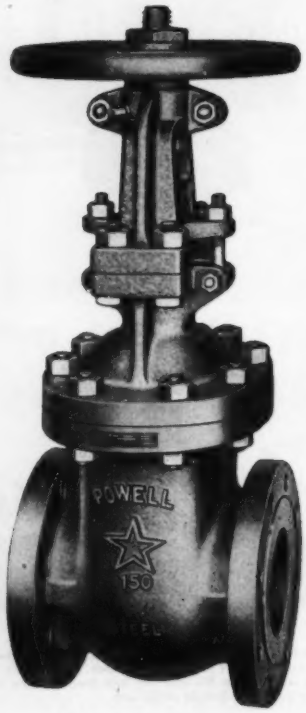


Fig. 1503—Class 150-pound Cast Steel Gate Valve with flanged ends, outside screw rising stem, bolted flanged yoke, tapered solid wedge.

Fig. 375 — 200-pound Bronze Gate Valve. Screwed ends, union bonnet, inside screw rising stem and renewable "Powellium" wear-resisting nickel-bronze disc.

*The Complete Powell Line includes Globe, Angle, "Y", Gate, Check, Non-return, Relief and Flush Bottom Tank Valves in Bronze, Iron, Steel and a wide range of Corrosion-resistant metals and alloys.

Ask your nearest Distributor—or write direct

The Wm. Powell Co., Cincinnati 22, Ohio

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OLIVER SAVEALL

Versatile:

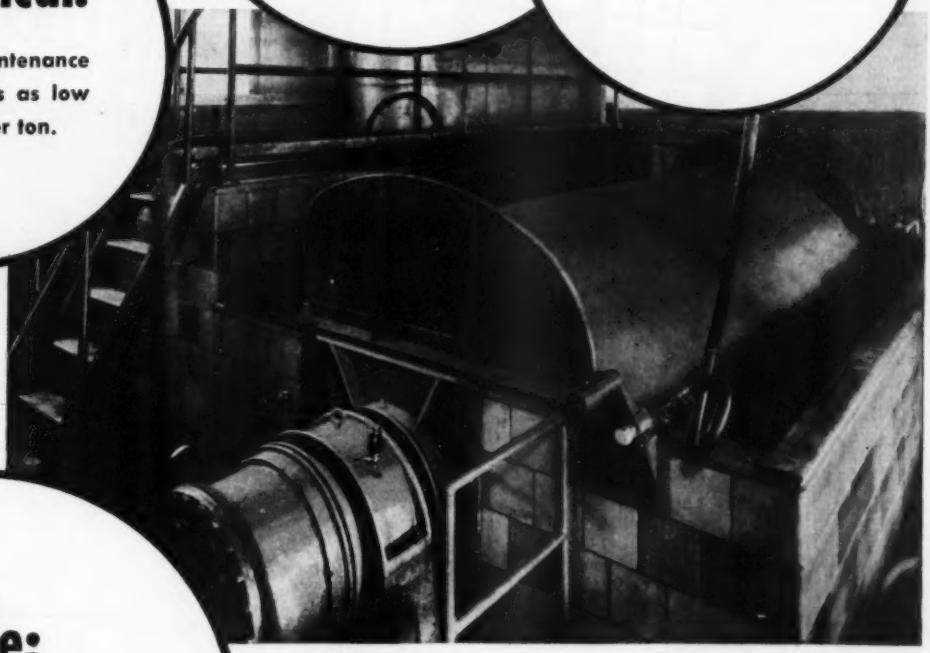
Recent installations are for handling kraft, sulphite, old paper and tissue furnishes.

Efficient:

Produces consistently clear filtrate, reusable on showers.

Economical:

Has shown maintenance and labor costs as low as 3½ cents per ton.



Picture shows Oliver Saveall as installed at St. Regis Paper Co., Tacoma, Washington. Rubber protected surfaces, stainless steel wire decks and outlet pipes.

Flexible:

Can handle wet breaks as well as white water without separate system.

When you buy an Oliver Saveall you are getting not only highly useful equipment which has proved its worth in hundreds of installations. You are getting, also, intelligent cooperative service from highly trained and experienced filtration engineers . . . with paper mill experience dating back to the early twenties.

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From all parts of the world, the finest wools are selected and sorted. Then for each Tenax Felt, the correct proportions of the right wools are mixed together to give you the most efficient felt possible, for the kind of paper your machine produces.

The Lockport representative in your territory is fully qualified to advise on all technical questions relating to felts. He is at your service as is our plant and all its people. We invite your inquiries.

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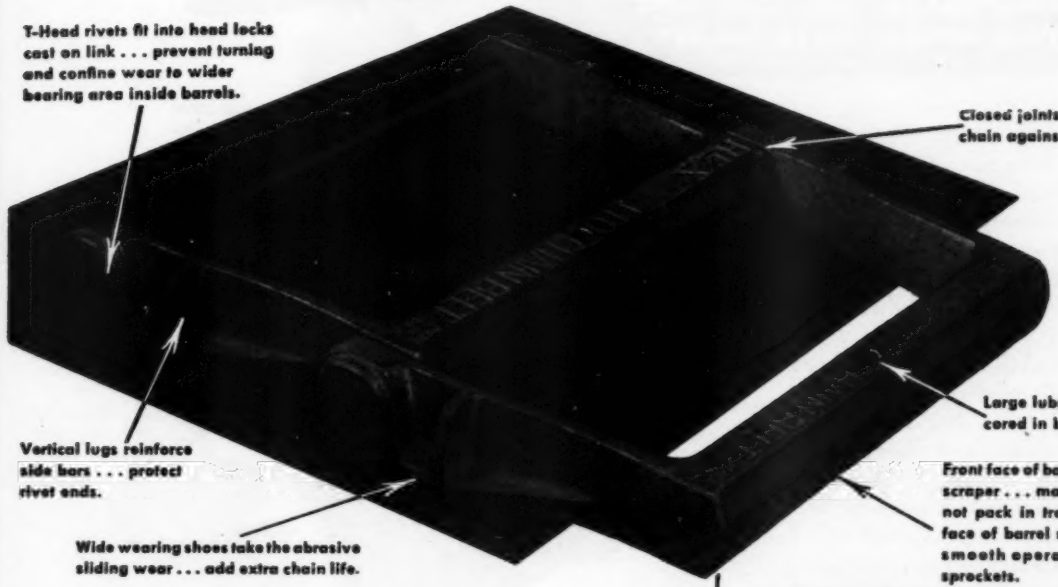
SLASH YOUR REFUSE HANDLING COSTS WITH REX H-TYPE CONVEYOR CHAINS


T-Head rivets fit into head locks cast on link . . . prevent turning and confine wear to wider bearing area inside barrels.
Closed joints protect chain against dirt.
Large lubricant chamber cored in barrels.
Vertical lugs reinforce side bars . . . protect rivet ends.
Front face of barrel acts as scraper . . . material does not pack in trough. Rear face of barrel shaped for smooth operation over sprockets.
Wide wearing shoes take the abrasive sliding wear . . . add extra chain life.

With Rex H-Type Conveyor Chains, you get the cost-cutting advantage of large capacity and even loading at low speed. Their great width permits them to handle bigger loads at lower speeds, thus reducing the abrasive wear on the chains and assuring long, economical service.

The outer barrel faces are designed to act as scrapers, and avoid any tendency to ride over material in the trough. You get efficient materials movement without the need or expense of scraper flights mounted on chain.

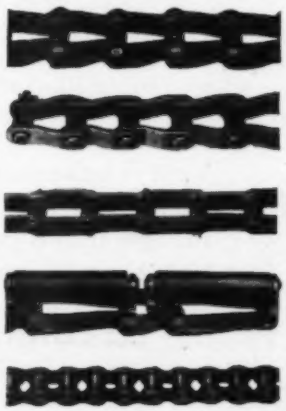
Rex H-Type Conveyor Chain links are one-piece castings ruggedly designed for long life. Their many outstanding advantages as shown in the illustration above assure most economical operation for years. They are available in both high quality Rex Malleable Iron and, where even longer service life is desired, in Rex Z-Metal.

For complete details on Rex H-Type Conveyor Chains and the other quality saw mill chains in the Rex Line, mail the coupon.

CHAIN BELT REX COMPANY — LUMBER MILL CHAINS

CHAIN BELT COMPANY *of Milwaukee*

OTHER REX QUALITY LUMBER MILL CHAINS



CHAIN BELT COMPANY
1714 W. Bruce Street
Milwaukee 4, Wis.

☐ Please send me my copy of Bulletin No. 48-27
☐ I would like to see a Rex Field Sales Engineer

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Company.....*Dept*.....

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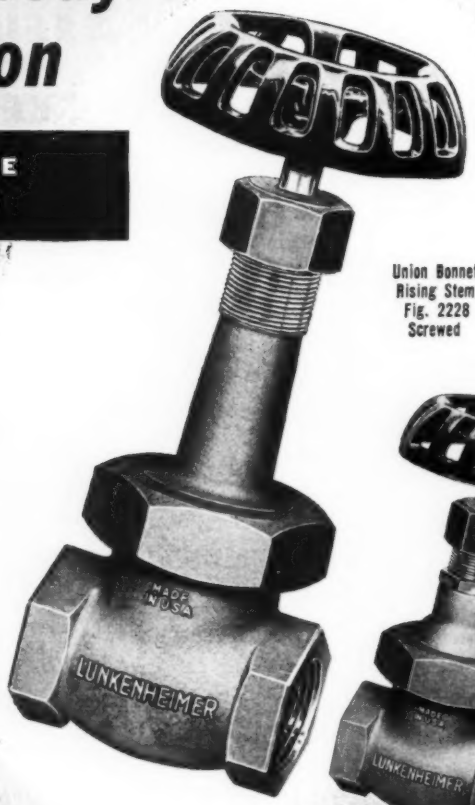
The cylindrical body defies distortion

LUNKENHEIMER FIG. 2228 LINE
UNION BONNET GATE VALVES

In this design of 200 lb. S. P. Bronze Union Bonnet Gate Valves, Lunkenheimer incorporates the first application of full cylindrical body sections in bronze gate valves. This construction, previously used only in higher-pressure steel valves, provides great strength and maximum resistance against distortion of the valve body and seats due to internal pressure strains and other stresses. Tests made under conditions far more severe than those encountered in actual service prove that this design will not distort and will maintain initial proportions and seat tightness.

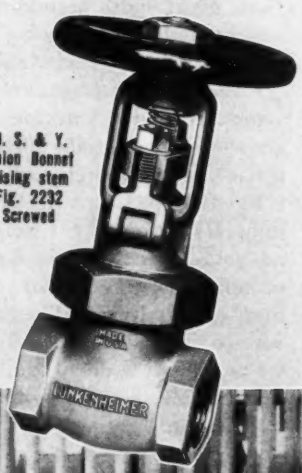
In addition to the cylindrical body construction and other service-giving features, the valves are equipped with stems made of the distinctive silicon bronze alloy developed by Lunkenheimer to eliminate stem-thread failure due to wear.

Your Lunkenheimer Distributor will gladly show you how this valve's extra strength means extra service, extra value, too! Ask for Circular 534 or write direct.



Union Bonnet Rising Stem Fig. 2228 Screwed

Union Bonnet Non-Rising stem Fig. 2230 Screwed



O. S. & Y. Union Bonnet Rising stem Fig. 2232 Screwed

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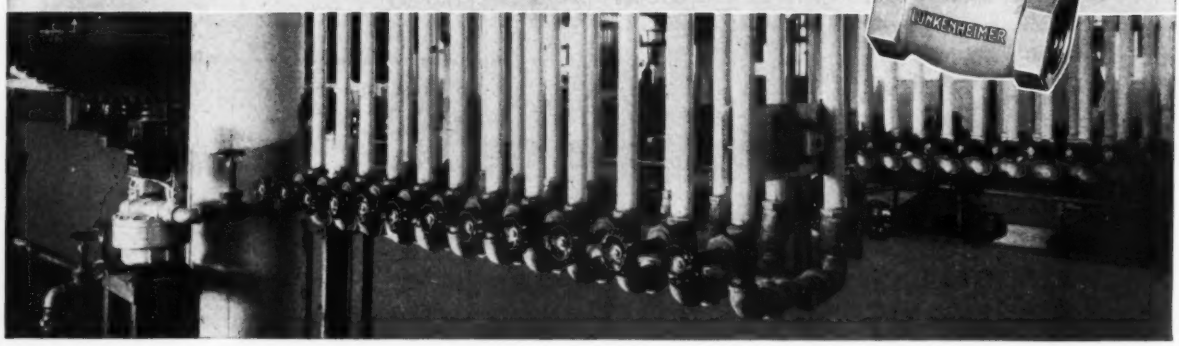

CHEMICAL USERS' GUIDE To General Chemical Products for the Paper Industry

PRODUCT	AVAILABLE FORMS	COMMERCIAL STRENGTH (MIN.)	SHIPPING CONTAINERS	APPLICATIONS
Aluminum Sulfate $Al_2(SO_4)_3 \cdot 14H_2O$ approx. *(Alum)*	Commercial & Iron Free: Lump, Ground Powdered	17.25% Al_2O_3	Bags Bulk Carloads	Precipitation of rosin size and filler; water clarification; manufacture of satin white; pitch control; mordant for dyes.
Aluminum Sulfate $Al_2(SO_4)_3$ + water *(Liquid Alum)*	Liquid	32° Be (total Al_2O_3 7.2%)	Tank Trucks Tank Cars	Same as commercial dry product but lower strength.
Salt Cake Na_2SO_4 *(Sodium Sulfate)*	White or Grayish Granules	95-99% Na_2SO_4	Bags Bulk Carloads	Used in kraft cooking liquors as the source of Na_2S.
Glauber's Salt, Crystal $Na_2SO_4 \cdot 10H_2O$ *(Sodium Sulfate)*	Colorless Crystals	96% $Na_2SO_4 \cdot 10H_2O$ (42.3% Na_2SO_4)	Bags Barrels Fibre Drums	Substitute for salt cake in kraft cooking liquor.
Glauber's Salt, Anhydrous Na_2SO_4 *(Sodium Sulfate)*	White Granules	99.5% Na_2SO_4	Bags Bulk Carloads	Same as Crystal but stronger product.
Sulfuric Acid H_2SO_4	Liquid	66° (93.19%), 99% 20% oleum and higher strengths	Carboys Steel Drums Tank Trucks Tank Cars	Wire souring; parchmentizing; acid wash in last stage of multi-stage pulp bleaching; neutralizing tall oil soaps.
Sodium Thiosulfate $Na_2S_2O_3 \cdot 5H_2O$ *(Hypo)*	Colorless Crystals	99.75% $Na_2S_2O_3 \cdot 5H_2O$	Bags Fibre Drums	Anti-chlor.
Sodium Sulfite, Anhydrous Na_2SO_3 *("Sulfite")*	White Powder	98.5% Na_2SO_3	Bags Fibre Drums	Anti-chlor.
Sodium Silicate $Na_2O \cdot XSiO_2$ + water *(Water Glass)*	Liquid	38°, 41°, 42° Be; special and higher strengths	Steel Drums Tank Cars Tank Trucks	Adhesive for corrugated and solid fibre board; used in coating mixtures to reduce viscosity and in beater sizing to stiffen paper. Aid in bleaching & flocculation.
Chromium Potassium Sulfate $K_2SO_4 \cdot Cr_2(SO_4)_3 \cdot 24H_2O$ *(Potash Chrome Alum)*	Red Violet Crystals	99.5% $K_2SO_4 \cdot Cr_2(SO_4)_3$ $24H_2O$	Fibre Drums	Used in "save-all" or white water systems.
Aqua Ammonia NH_4OH + water *(Ammonia)*	Colorless Liquid	26° Be (29.4% NH_3)	Carboys Steel Drums Tank Trucks	Used with chlorine to form chloramines for slime control.
Sodium Fluoride	Powder	90% NaF 95% NaF	Fibre Drums	Preservative and stabilizer for starch in coating mixtures.
Tetrasodium Pyrophosphate, Anhydrous $Na_4P_2O_7$ *(TSPP) (Pyro)*	White Powder	98% $Na_4P_2O_7$ (Equiv. 52% P_2O_5)	Bags Fibre Drums	Felt washing; pitch dispersion.
Nitric Acid HNO_3 + water	Liquid	42° Be 67.2% HNO_3	Carboys Drums Tank Trucks	Nitrating pulp; cleaning monel metal.
Sodium Sulfide Na_2S + water	Red Chips or Solid Mass	60% Na_2S	Steel Drums	Substitute for salt cake in modified soda process.

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FOR AMERICAN INDUSTRY

The products advertised are commercial chemicals having various uses, some of which may be covered by patents, and the user must accept full responsibility for compliance therewith.

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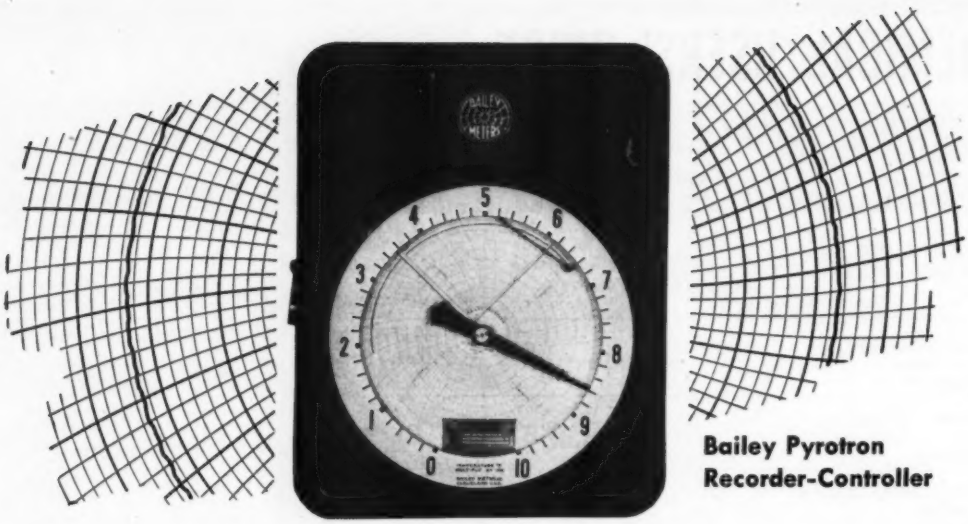


Bailey Pyrotron Recorder-Controller

Looking for Better Temperature Instruments?

. . . Then check these features of Pyrotron Electronic Resistance Thermometers . . .

FUNDAMENTAL ACCURACY

Bailey Pyrotron Resistance Elements are made of highest purity platinum—the material used by the National Bureau of Standards in establishing basic standards for temperatures from −190°C to +660°C.

THREE TYPES OF CONTROL

Pyrotron Controllers may operate: on-off electrical systems by either electronic relays or electric contacts, modulated electronic systems, or air-operated systems. Two temperatures may be recorded on the same chart and controlled by a single instrument.

FACTS PUT INTO USABLE FORM

Bailey Pyrotrons may be arranged to put temperature facts into convenient usable forms. If two or more temperatures are related, they may be recorded as continuous records on the same chart for easy comparison. The average of several temperatures or the difference between two temperatures may be recorded as a single continuous record which may be retransmitted to a distant point or used to actuate a control system.

EASY INSTALLATION

Bailey Pyrotrons do not require careful leveling or protection against vibration. Three ordinary copper wires are all that is needed to connect each temperature sensitive element with the recorder. Power may be taken from any 115 volt 60 cycle circuit.

MINIMUM MAINTENANCE

The absence of galvanometers, batteries and standardizing equipment, together with the use of interchangeable unit assemblies, reduces Pyrotron maintenance to the vanishing point.

ABUNDANT POWER

A separate motor drive for each temperature furnishes abundant power to operate a recording pen, a controller and an alarm switch.

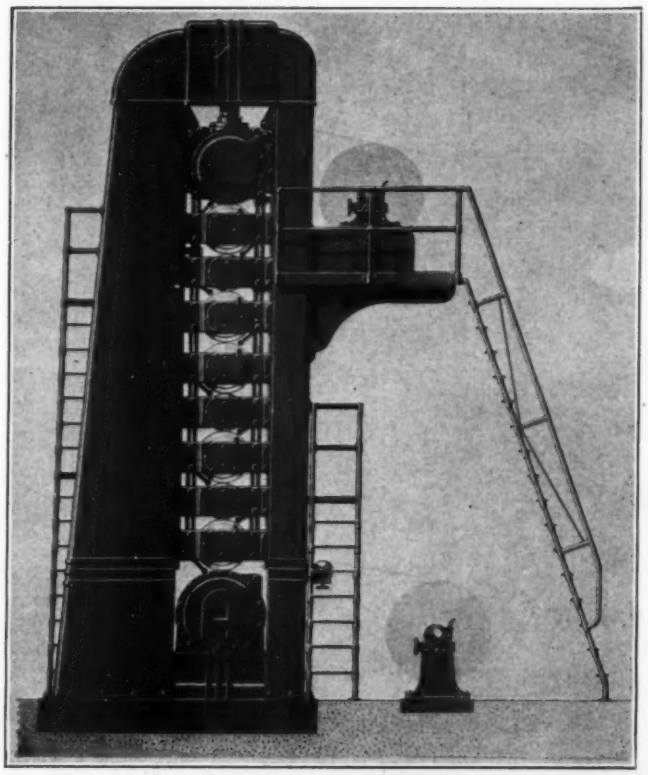
For the full story on this unusual electronic resistance thermometer which is suitable for ranges between −300°F and 1200°F, ask for Bulletin No. 230-C. P-21

BAILEY METER COMPANY

1058 IVANHOE ROAD • • • CLEVELAND 10, OHIO

Controls for Processing

TEMPERATURE
PRESSURE
% OXYGEN
% COMBUSTION
FLOW
LEVEL
DENSITY
RATIO

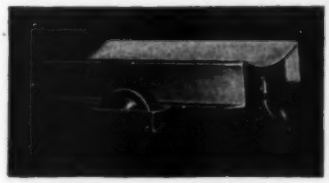


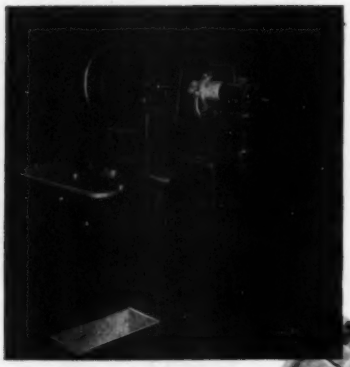
HIGH-SPEED

SUPERFINISHING EQUIPMENT

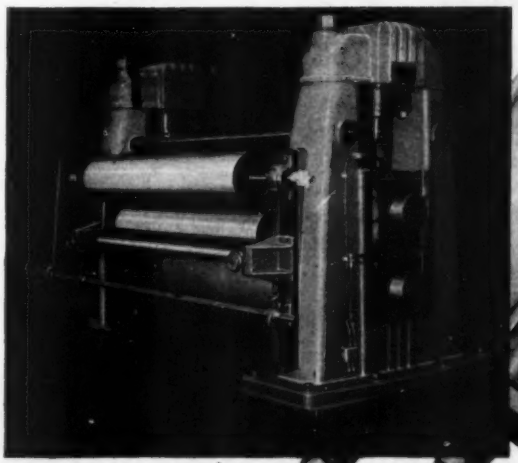
APPLETON has had long and highly specialized experience in all phases of superfinishing. Today it offers a complete line of equipment for the paper industry. Here are high-speed supercalenders in all sizes, from small laboratory models to huge stacks that take full paper machine widths. Here are the latest mechanical and electrical advancements for more efficient overall performance. Here is the most complete selection of filled rolls in America, a roll type for any paper or finish. Here are special process cotton rolls for coated stocks running at speeds up to 1800 feet a minute. Here is modern auxiliary equipment for reduced maintenance and reduced operating costs. For everything for superfinishing in the paper industry – see APPLETON first.

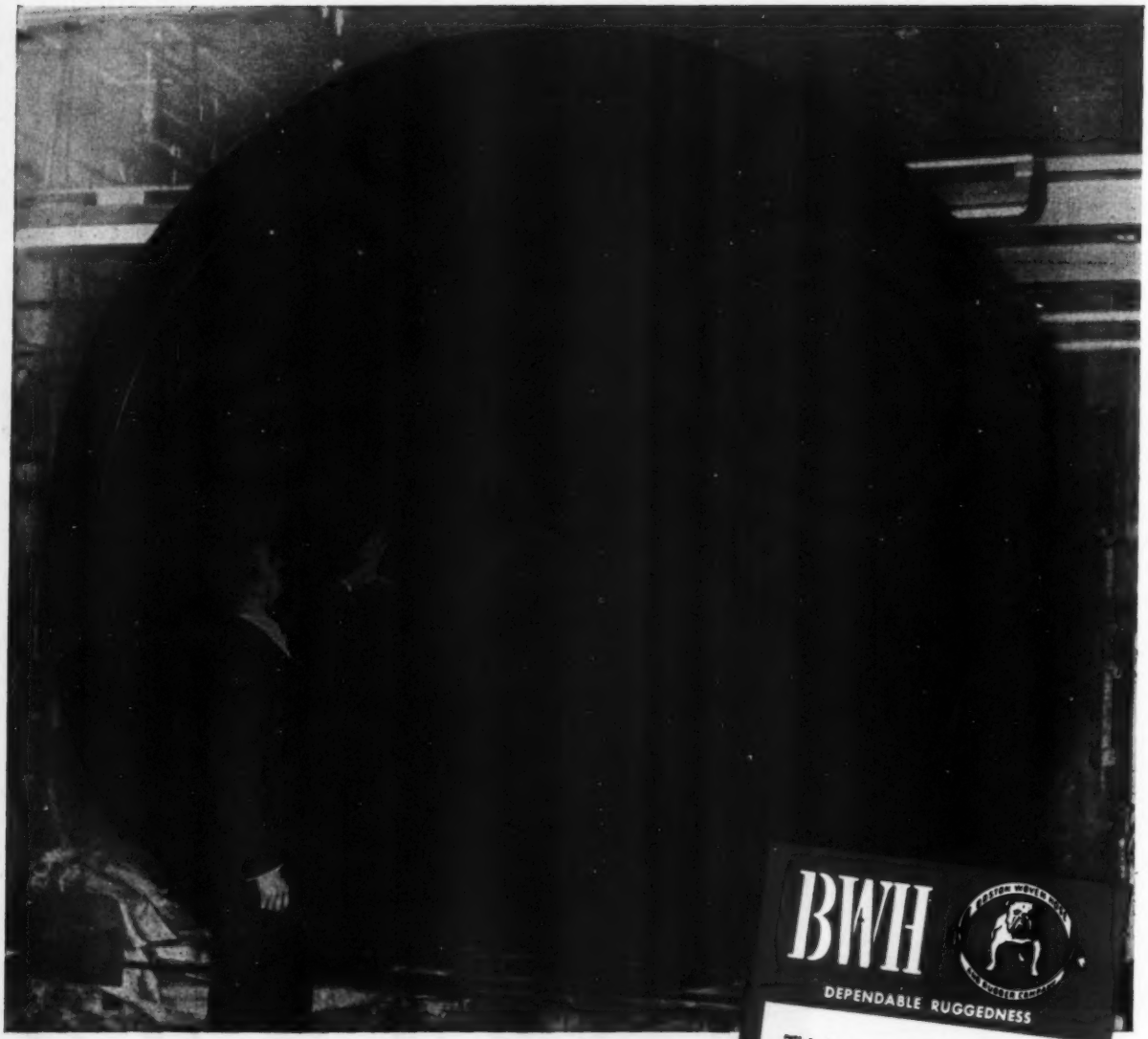
AUXILIARY EQUIPMENT— Unwind and Windup Stands, Friction Brakes, Special Roll Trucks, Etc. developed to maintain high-speed finishing,— high production.





EMBOSSING CALENDERS and Rolls, Special Stacks, Etc. all with the advanced Appleton features.





Huge *one piece* BWH Belt

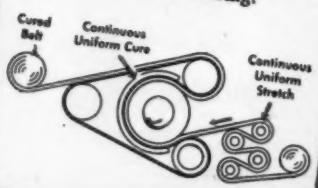
DESIGNED TO CUT WASTE LINES!

When BWH engineers were called on to produce a fast, power-saving, economical belt for a coal mine, this 13-ton Silver King ROTOCORD BELT was the result. It's one of the largest one piece conveyor belts ever produced. Made by the famous, exclusive BWH ROTOCURE Process of continuous vulcanization, this giant is 1576 feet long, 48 inches wide. It will haul better than 500 tons an hour on a rugged grade at the fast clip of 400 feet per minute. Maintenance worries are lessened by the absence of splices. It's another top performance by BWH . . . leaders for 71 years in the manufacture of mechanical rubber goods of dependable ruggedness for use in all industries.

BWH

DEPENDABLE RUGGEDNESS

This is the ROTOCURE Process of continuous vulcanization, exclusive with BWH. It does away with the 30 to 40-foot overlaps occurring in the duck carcass in old-fashioned flat-press curing, eliminates the possibility of operational weakness caused by such overcuring.



HAVE YOU A JOB WHERE STAMINA COUNTS? Bring us your toughest problems. We're specialists in solving them. Consult your nearest BWH distributor or write us direct.

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

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The Paper Industry

July 1950

The paper industry is ready

POSSIBILITY OF WAR brings to mind a comparison of the state of our industry now as against what it was a short decade ago. Then we were struggling out of the depression and were just beginning to carry out plans for long overdue modernization and replacement of obsolete processes and equipment. Then when war came, practically all improvement programs in some state of incompletion were put in mothballs, awaiting the end of hostilities.

Now, five years after the war ended we are again faced with threats against peace. But this time the paper industry is in the best physical shape in its history. Numerous new mills have sprung up. A great many existing mills have added capacity by installing new equipment or by re-building or modernizing old machinery. Practically every mill worth its salt has taken steps to improve operations and efficiency in order to meet the competition of today's markets where quality and price are paramount.

It has been stated that our successes in war have been largely based on the ability of our industrial machines. If this is so, the paper industry is ready to do its part. If all other branches of American industry are as well prepared we have little to fear. Our only hope is that our statesmen are as proficient as our business leaders.

Don't burn our paper before it gets made

THE PROPHETS ARE IMPROVING! The weatherman can now tell us, and pretty accurately too, when the next shower is due. The traffic analysts can predict, almost to a victim, how many people are going to die on a certain day. And now the U. S. Forest Service gets into the act with a prediction about this summer's fires.

Yes, they say, this year careless citizens will burn up enough timber to cover the state of Pennsylvania. And that much timber would provide pulpwood for millions of tons of paper. And it's obvious that we can't afford to lose that much paper.

But why is the forest service so gloomy, you ask? Well, this year drought has been unusually severe in many parts of the country. And this year more people are expected to travel to more places, taking with them careless attitudes toward fires. So it can be quite accurately predicted that 90 per cent of the forest fires will still be caused by human carelessness.

However, close inspection reveals a slight gleam of hope in the picture. One Forest Service official noted that the number of fires last year was considerably below that of the prewar years even though 50 per cent more people are using the forests today for vacationing, fishing, hunting, and other recreational purposes. So perhaps the several million dollars spent annually by the government and businessmen to educate us in preserving our forests from fire are having some effect.

But is this effort enough? Lyle F. Watts, chief, Forest Service, U. S. Department of Agriculture, pointed out that 83 per cent of the total area burned last year was on unprotected forest land where neither state nor federal agencies maintain fire detection and suppression crews.

On the whole, there isn't much that's new in fire fighting this year. Of course they'll use airplanes, helicopters, portable lumbering equipment, radios, plows and parachuting smoke-jumpers in the fight, as they have done in the past. But one new technique that improves the building of firebreaks has been worked out for this year, according to Carl A. Gustafson, chief of U. S. Forest Fire fighters. Usually, when the perimeter of a fire is pretty well outlined one big job is to ring it with a "fireline" — hacking out or plowing a "firebreak" to isolate the blaze and keep it from jumping or spreading.

Now a new plan for more effective action has been drawn up. One crew is to go out through forests with portable saws to cut out a lane or path through timber. Then another crew will follow with a rotating, whirling scraper device to clear away brush and other debris. This gang will be followed by a crew to clean out the break. They'll use "controlled" flames in the "cleaning up" process. The idea will be to prevent the main body of fire from jumping across the firebreak by depriving it of anything to burn.

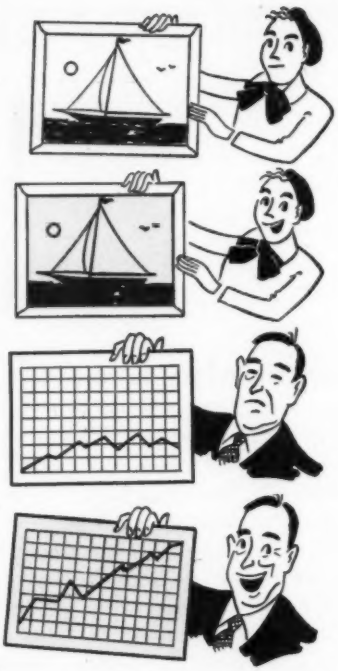
But even the use of modern equipment and methods isn't going to save those millions of tons of paper products. The only way to save them is to prevent the fires —and that means watchfulness on the part of every one of us. Don't let's burn up our paper before it gets made.

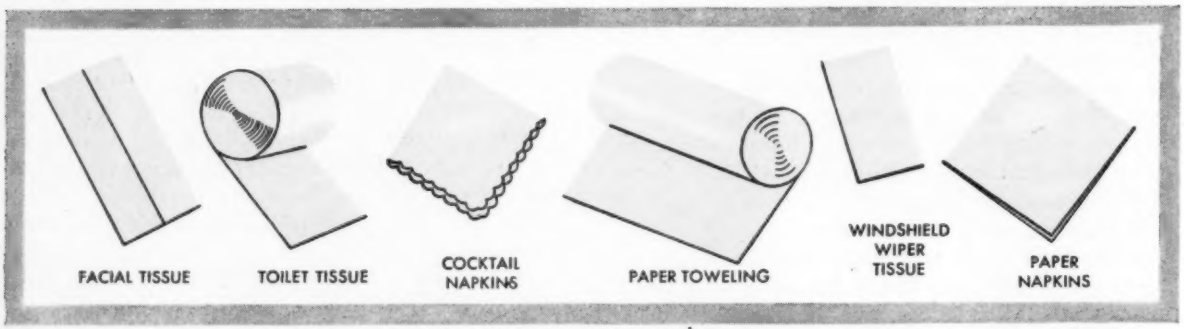
Some artists paint pictures with black and white . . .

But most find it's better when they add a dash of color.

The same is true of your paper sales picture . . .

Much better with a dash of Du Pont Dyestuffs color.





In a field where most products look alike, the addition of COLOR can be an important sales advantage. For color does more than get attention. When properly used, it says something about the product.

Gay, brightly-colored cocktail napkins, for example, fairly shout "party, fun!" Pastel-shaded toilet tissue seems to look softer, more absorbent. Every paper tissue product has some colors that are natural for it . . . that give an extra sales push.

Our Technical Staff will be glad to help you select the right color for your tissue products, and recommend dyes for getting these colors. For information write: E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Div., Wilmington 98, Delaware.

More color makes more business...for your customers and you

Du Pont Dyestuffs

DUPONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

FOR GROUNDWOOD BASE PAPER

Du Pont basic dyes

FOR UNBLEACHED KRAFT

Du Pont basic dyes, direct dyes and dispersed organic pigments

FOR BLEACHED SULFITE

Du Pont direct dyes

Pontamine* Yellow SXG

Pontamine* Fast Yellow RL

Pontamine* Fast Scarlet 4BA and 4BS Conc. 150%

Pontamine* Fast Orange WS Conc. 175%

Pontamine* Sky Blue 6BX Conc. 150%

*REG U S PAT. OFF

High level paper price-production indicated for third quarter

THERE IS NO INDICATION at present that the high record of paper production is likely to fall off materially during the third quarter of 1950, although orders have been at such a high level there was a natural feeling that there must be some reaction. Many economists had expressed doubts as to a continuance of over-all business activity in the July quarter. On the contrary, conditions have developed in a contrary direction, and an announcement of increases in domestic pulp prices for the third quarter is likely to be followed by higher paper prices, in order for the paper mills to absorb the increased cost of their basic raw material.

Average paper production for the first six months has been more than 100 per cent of six-day operating capacity and the production of paperboards has been increasing, though at a lower rate. Paper manufacturers generally are averse to quoting prices for third-quarter delivery, and in some instances are taking orders subject to current prices at the time of delivery. There is little question that the demand for paper is unseasonal and the usual summer drop in demand has not yet made its appearance. The mass shutdowns in the paper mills during the July vacation period will result in a drop in production, but with the mills in many cases well behind in deliveries this drop in output will only serve to tighten the market.

Newsprint inventories low

The loudest complaints of paper shortage comes in the newsprint field. Capacity is beyond question insufficient to meet the increased demand which is now at all-time high levels. Inventories in this field are low, and in other fields there is no indication that demand is aimed at maintaining present inventories. In short, the present condition is that consumer demand is in excess of normal production capacity. As long as general business continues prosperous, paper must be supplied to meet the exigencies of any operating business, whether it be manufacture or distribution.

An estimate of the over-all paper situation was given by the paper committee of the National Association of Purchasing Agents in a recent report, which can be summarized as follows: Boxboard supply higher than a year ago; kraft paper in short supply because of use of sulphate in multiwall shipping sacks; book paper output at a new high level in March; fine papers, demand heavy, with prices dependent in part on labor factors; newsprint, gray market feared because of short supply.

Congressional spotlight on newsprint

Newsprint came to the front at Washington last month with the opening by the Celler antimonopoly committee of Congress of its investigation of this grade of paper. The committee previously had taken testimony on steel and many witnesses were called to testify on newsprint. The trend of the inquiry is indicated by the opening testimony by a large user that prices are excessive.

Canada has resented sharply the contention that the United States can take any action on price agreements, if any, reached in Canada. The United States antitrust laws, so states Canada, cannot be enforced there, and Canadian producers are acting in accordance with Dominion laws. On the other hand, Congressman Celler is taking the position that there should be legislation on this side of the border to prevent United States participation in any international arrangement to split up world markets.

Witnesses from the industry are expected to take the position that when Congress made newsprint duty free it destroyed the incentive to produce paper in this country. The development of mills in the South in recent years is ascribed more to the need of southern publishers to assure themselves of a guaranteed source of supply than to a manufacturing profit motive. Freight rates from Canada are in some cases more than equalized by the higher cost of production in the South with the result that paper produced at home costs less than Canadian paper with high freight rates added.

Watch effect of developments in Washington

The eyes of business men are centered more on Washington in these recent months because of the volume of legislation which will have a definite impact on business operations. None of the proposed legislation is aimed at promoting business prosperity, but rather to restrict present methods of operation. Congress, however, can hardly be expected to finish much of its legislative schedule before late in the summer, and hot weather may lead members of Congress to defer much legislation until later months. The fall elections may bring a different complexion to Congress.

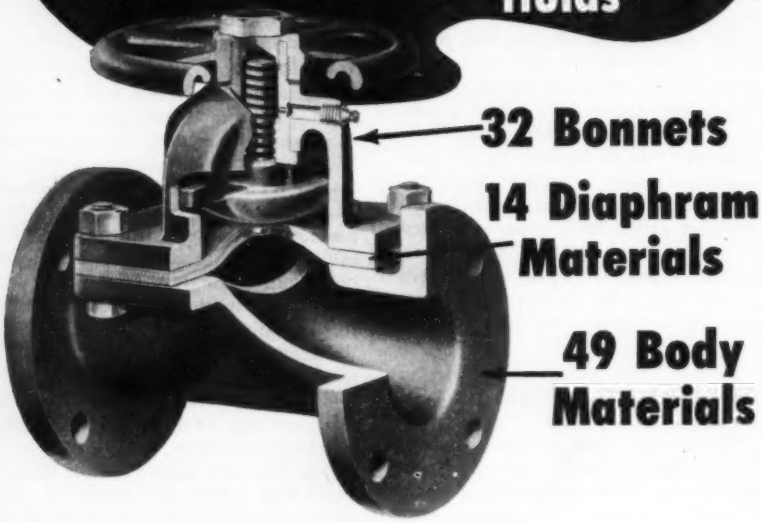
The President has vetoed the Basing Point bill, which was aimed at permitting manufacturers to absorb shipping costs to produce reasonably equivalent prices for essential commodities in all parts of the country. The bill was intended to overcome Supreme Court decisions holding some forms of freight allowances to be violations of law. Carried to its ultimate, this theory would result in the establishment throughout the entire country of small units to supply local needs. Proponents of the Basing Point bill had claimed that such establishment of small units would largely cancel the great price advantages attainable only through mass manufacture.

The question of new taxes is another issue in the balance, and one not likely to be settled for weeks to come. The demand for repeal of excise taxes has been demanded, but President Truman has insisted that other forms of revenue must be devised to balance the loss of income through taxes on transportation, theater tickets and the like. The Ways and Means Committee of Congress has come up with a proposed answer—the usual proposal to increase excess profits taxes on manufacturers. Whether the public will eventually realize that "soak the rich" proposals eventually result in higher cost of the

Hills-McCanna offers

Over 20,000

different assemblies for valving "hard-to-handle" fluids



All the various possible combinations of bonnet assemblies, diaphragms and body materials available in Hills-McCanna valves total over 20,000! True, many of the combinations would not be practical, but this figure does indicate the tremendously wide variety of valves that Hills-McCanna offers. No matter how specialized your problem of valving corrosive and/or hazardous substances, slurries, viscous liquids, gases, fermentation products, materials subject to coagulation, foods or beverages, the chances are that Hills-McCanna can furnish the proper valve to meet your needs.

Hills-McCanna valves are Saunders patent diaphragm valves wherein the closure is affected by pressing a resilient diaphragm against a transverse weir. Working parts are isolated from the flow. The valve is leak-tight and requires no packing. Sizes from 3/8" to 14".

Write, today, for full information and descriptive literature, HILLS-McCANNA CO., 2433 W. Nelson St., Chicago 18, Ill.

HILLS-McCANNA

Saunders patent diaphragm valves

Proportioning Pumps

Force-Feed Lubricators • Magnesium Alloy Castings

goods they buy remains to be seen.

Not the least of the Washington developments affecting business is the change of Congressional sentiment on the Reciprocal Trade Agreement program. The public is becoming aroused by the danger of unemployment through increased low priced imports. One Senator who said he had voted for this legislation told the Committee which has been taking testimony for use in rate reducing negotiations in England this fall that he would not vote for a continuance of the program as a result of the manner in which the Administration has used the powers voted to it. Bills have been introduced to again insert in the trade agreement act provisions for a peril-point below which duty rates cannot be reduced, such a peril-point to be that at which injury would result to domestic industry from foreign competition.

Another storm has been raised by the action taken by Congressman Buchanan as chairman of the Congressional Committee to investigate lobbying. Information has been demanded from nearly 200 corporations on their use of funds to influence legislation, including expenditures for newspaper advertising their views of pending legislation. It has been claimed that corporations whose advertisements have been used to urge support of President Truman's legislative proposals were carefully excluded from the inquiry into such expenditures. The result has been the introduction of a resolution for the naming of another Congressional Committee to investigate Congressman Buchanan's committee—piling Ossa on Pelion as it were.

THE SENATE JUDICIARY COMMITTEE has approved the bill already passed in the lower house to make it a violation of the Anti-Trust Act for any company to acquire the assets of another if such acquisition lessens competition or tends toward monopoly. In other words, if a man wishes to retire from business and enjoy his savings, he cannot sell his business to anyone else who produces the same commodity.

APPA Files Statement Re Water Resources

The Paper Industry has filed a detailed statement through the American Paper and Pulp Association giving its views on proposals for the development of the nation's water resources. Proposals for a series of Government Authorities, to cover every part of the country as has been done by the Tennessee Valley Authority, involve problems of great interest to the Paper Industry, both as to water power and the need for large supplies of pure water

for the mills. The Industry argues that the Federal Government should do for states and citizens only those things which are sound and necessary and which they cannot do for themselves. Consideration for elements such as stream pollution, power necessities, watershed protection and flood prevention is urged through economic and technical research.

Financial

▶▶▶ WHILE THE NATION'S securities markets have slowed the advance in stock and bond values, there has been no reaction of any wide extent since the present bull market got under way. Paper mill securities have held their own in the rising market, and seem to be more popular with investors than has been the case in past years.

Soundview Pulp Co.—Net income for five months ended May 31 was $1,963,977 as compared with $2,264,806 for the comparable period a year ago.

Marathon Corp.—Net income for six months ended April 30 was $2,678,641 as compared with $2,324,920 for the comparable period a year ago.

Celotex Corp.—Net income for six months ended April 30 was $680,874, as compared with $506,740 for the same period a year ago.

United Board and Carton Co.—Net income for twelve weeks ended April 29 was $38,508 as compared with a deficit of $45,988 for the same period a year ago.

Riegel Paper Corp.—Net income for 1949 was $978,768 as compared with $748,374 in 1948.

New York Stock Exchange—Stocks

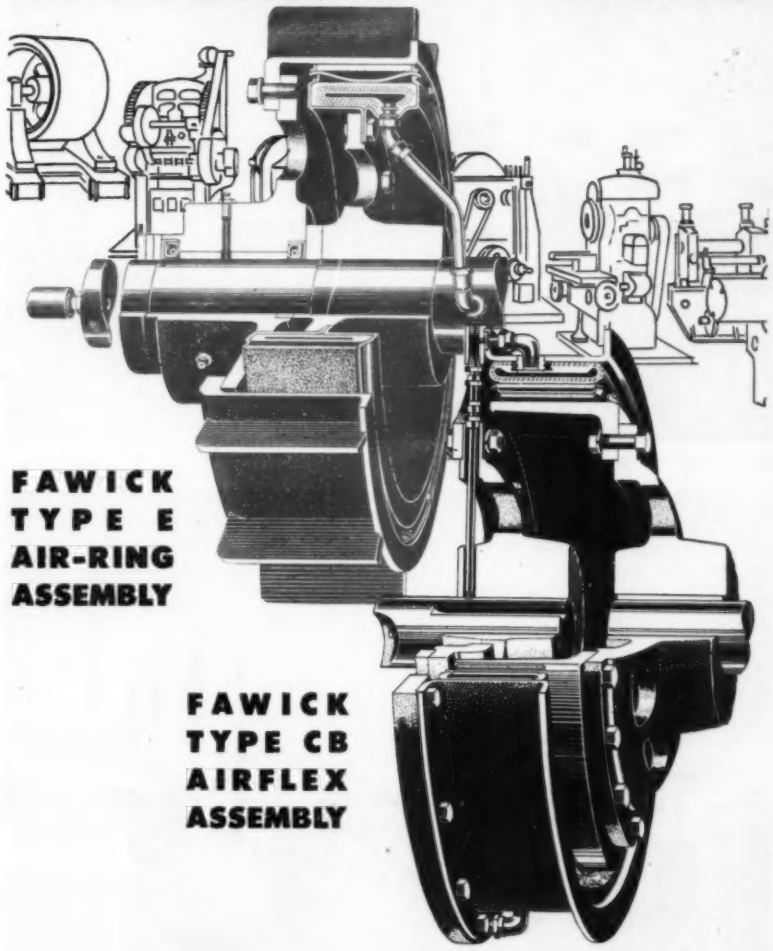
	Closing Prices June 20	May 20
A.P.W. Products	4	4
Celotex	18	19
Same Preferred	* 16½-16⅝	16⅝
Certain-teed Products	16⅝	18¼
Champion P. & F Co.	36⅞	39⅜
Same Preferred	103½	104½
Chesapeake Corp.	29½	28
Continental Diamond	* 8⅝-9	10⅜
Container Corp.	47¼	47
Same Preferred	*105-106	105
Crown Zellerbach	34½	35¼
Same Preferred	104½	103⅝
Same $4 Preferred	107¼	106½
Dixie Vortex	43	45⅜
Same "A"	52⅜	54¾
Eastern Corp.	14½	15
Robert Gair	8⅛	9⅛
Same Preferred	* 18⅝-18½	18¼
Gaylord Container	18½	20⅜
International Paper	46½	46
Same Preferred	*106¼-108¼	108
Kimberly-Clark	38⅞	38½
Same Preferred	143	132½
McAndrews & Forbes	* 40¼-41	40
Marathon	32	30⅜
Masonite	62	65¾
Mead Corp.	22½	23
Same Preferred	* 88-90	90
Same 2nd Preferred	* 44-46½	45⅜
National Container	8	8⅝
Paraffine Cos.	16¼	16⅜
Same Preferred	100¼	99⅜
Rayonier, Inc.	32⅞	33½
Same Preferred	34	33¼
Scott Paper	* 92-92¼	90½
Same $3.40 Preferred	*100¼-100½	98
Same $4.00 Preferred	*108-109	108¼
St. Regis	8⅝	9⅜
Same Preferred	87	90
Sutherland Paper	40¼	40
Same Preferred	*110¼-111½	*100¼-112
Union Bag & Paper	31⅜	30⅛
Union Board & Carton	9⅜	9⅛
United Wall Paper	* 3½-3⅝	3½
Same Preferred	* 23-25	24¾
U. S. Gypsum	128	133½
Same Preferred	*184-185½	188½
West Va. P & P Co.	53	53½
Same Preferred	*109¾-110	110¾

New York Stock Exchange—Bonds

A.P.W. Products 3%	81	81
Celotex 3¼%	101½	101⅝
Champion P. & F. Co. 3%	103	103¼
Mead Corp. 3%	102⅛	102½
Am Writing	6⅜-7	7
Great Northern	40⅝	40⅝

*Closing Bid and Asked Prices

EFFICIENCY TWINS



FAWICK TYPE E AIR-RING ASSEMBLY

FAWICK TYPE CB AIRFLEX ASSEMBLY

FOR POWER TRANSMISSION

When machine specifications call for efficiency, the logical answer is Fawick Clutches and Brakes.

Working individually or in combination, they provide Fawick-equipped machines with those operating characteristics which result in top machine performance. Quick response, positive action and control, elimination of lubrication, mechanical linkage and clutch adjustment comprise some of these advantages. The rugged design and construction provide long trouble-free machine operation in heavy-duty service.

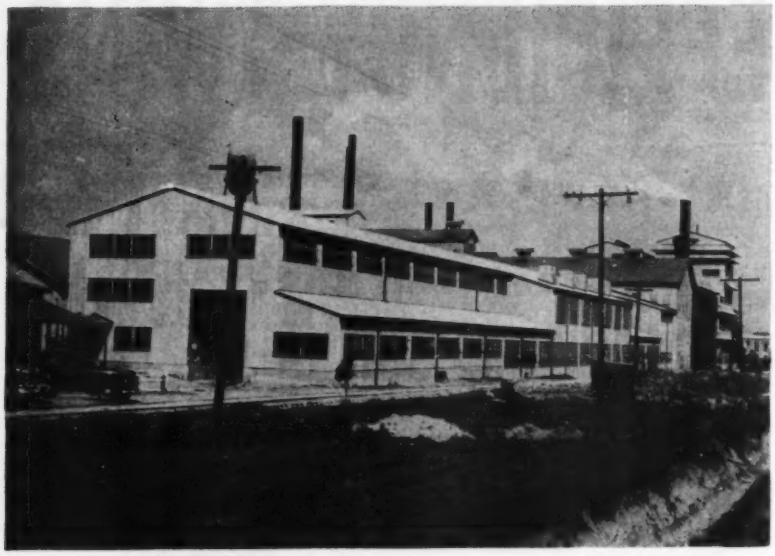
For specific information on all advantages of Fawick Industrial Clutch and Brake Units, write to the Main Office, Cleveland, Ohio, for Bulletin 300.

All desirable clutch characteristics are built into Fawick Airflex units

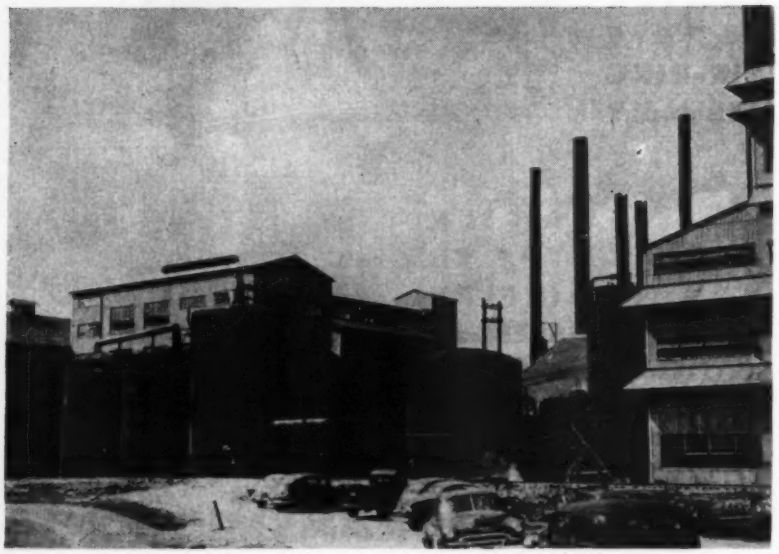
FAWICK Airflex CO., INC. 9919 CLINTON ROAD CLEVELAND 11, OHIO

FAWICK CLUTCHES = + + + = PEAK EFFICIENCY

RADIAL CONTACT 360° RADIAL CONTACT SHOCK ABSORPTION CONTROLLED TORQUE



General mill view showing main machine room



Evaporator court and wash tanks

Calcasieu "Operation Integrated"

▶▶▶ A PROJECT completed recently began in 1946 when the Jacksonville Paper Co., Jacksonville, Florida, purchased the controlling stock of the Calcasieu Paper Co., Elizabeth, La.

The Calcasieu company was founded in 1926 by the Industrial Lumber Co. Since that time the plant at Elizabeth has been making sulphate pulp and one 108-inch fourdrinier machine has produced approximately 60 tons of wrapping paper per day.

When the new organization took over in 1946, the modernization was planned and an expansion program that cost six and a half million dollars has just been effected. Alvin H. Johnson Co., of New York City, was engaged to handle the engineering, and plans were made to build around the old installation an entirely new pulp mill and recovery system to serve both the old and the new machines.

This program has now come into completion and on May 6, 1950, the new pulp mill at the Calcasieu plant in Elizabeth, began operations. The new 160-inch Puseyjones paper machine in addition to the old fourdrinier machine is turning out 200 tons of wrapping paper per day. The basis weight of the paper produced varies from 25-90 pounds, but with the bulk of the production going into standard bag, wrapping, and butchers papers.

An illustrated description of the new Calcasieu plant will be presented in a subsequent issue of this magazine.

The new owners also erected at the mill site a modern bag plant containing 35 bag converting machines and a rolled printer and rewinding machine, providing a capacity of three and a half million bags and sacks of different types. This integrated operation was planned to supply the 17 branches of the Jacksonville Paper Co. in the southern states as well as the general customers of the mill.

The general offices of the Calcasieu company are in Jacksonville, Fla. Officers of the company are:

President and board chairman—Clifford G. McGehee; Secretary and Treasurer—M. R. McGehee; Vice President—C. C. McGehee; Vice President—Tillman Cavert, Jr.; Assistant to the President—T. R. McGehee.

Located at the mill in Elizabeth are: Vice Pres. and G. M.—Edward K. Ahrens; Assistant Treasurer—J. E. Bond; Production Manager—W. L. Vignes; Chief Engineer—Lee Howard, Jr.; Forester—B. A. McMahon; Purchasing Agent—W. M. Cunningham; Personnel Manager—A. A. Cavanaugh; Paper Mill Superintendent—G. W. Mullins, Sr.; Asst. Paper Mill Supt.—C. J. Hanchey; Chief Electrician—Dennis Sirman; Maintenance Supt.—L. C. Gill, Sr.; Steam Superintendent—L. J. East; Finishing Room Supt.—J. D. Collins.

Import Notes

Claims for the duty free admission of printing papers well outside the definition of standard newsprint continue to come before Customs officials and the Customs Courts, according to Warren B. Bullock, manager of the Import Committee of the American Paper Industry. A Florida newspaper claims that an importation consisting of paper with 45 per cent sulphite should be duty free, though such paper is a standard grade of book paper. At Portland, Ore., the officials classified a paper for a newspaper for duty, on the ground that it was excessively sized, sufficiently so to be used for writing paper; this case was protested to the United States Customs Court.

According to Mr. Bullock, the reduction of duty rates by various Reciprocal Trade Agreements is having its effect in the claims for lower duty rates on various grades of paper. Several shipments of English and French drawing papers have been classified for duty

at the higher rate for hand made papers, and the importers are claiming that these papers should be dutiable as drawing papers. Regular shipments of European paper napkins are being received, and in all cases the importers are claiming a lower rate of duty than that assessed by the officials. A test case on the classification of such merchandise is now pending in the United States Customs Court.

A laminated tag board has been imported from Europe, the lower rate of duty fixed by trade agreements making it possible for this material to be sold at less than the American cost of production.

Considerable Japanese high grade tissue paper is being assessed for duty at values higher than those claimed by the importers. The Japanese tissue paper manufacturers are again in the American market with a considerable tonnage of high priced papers.

New Converting Plant Planned by I.P. Co.

Work has begun on a new paper converting plant at Kalamazoo, Mich., which will house the Single Service Division of International Paper Co. The company has obtained an 11-acre site on Miller Road, southeast of the city. The building permit, obtained by the contractor, Miller-Davis Co., calls for an outlay of $300,000 for construction alone; company officials would make no estimates of the amount to be spent for the special equipment to be installed.

Paper milk bottles, currently manufactured in quarters leased in Kalamazoo, will be produced under the direction of the present manager, Henry J. Haas.

Construction of the 248 ft. by 260 ft. structural steel and brick building will be governed by the exacting sanitary requirements demanded by local and state laws. The entire manufacturing portion of the building will be lined with glazed tile.

Approximately half of the main building, Mr. Haas said, will be devoted to the manufacturing process, with the remainder of the building planned for warehouse use. On the south and west sides sections will be devoted to office space, storage, and utility rooms. In keeping with the firm's practice in other cities, Mr. Haas remarked, the surrounding grounds will be landscaped and the whole made something of a show place.

This will be the third plant constructed for the manufacture of paper milk containers by International. Other plants are at Norristown, Pa., and Bastrop, La.

International makes the milk bottles of high grade, 100 per cent virgin sulphate stock produced in its own mills. Wax impregnation is done in machines installed in dairies licensed to use the bottles; the entire process is done with handling only by machines and is closely controlled to insure a sterile product.

Kalamazoo Panelyte Div. of St. Regis Paper Starts Operation

At an informal dinner at Kalamazoo, Mich., which celebrated the start of production of laminated plastics at the Panelyte division of St. Regis Paper Co., C. C. Mahaney, company vice president and manager of the division, announced that shipments from the plant have begun.

The plant, which when completed some time in September will represent an investment of approximately $5,000,000 will employ about 300 persons and will add about 50 per cent to Panelyte division production.

The Kalamazoo Panelyte plant will supplement the output of the division's major plant at Trenton, N.J. Decorative, and part of the molded, panelyte operations will be moved to Kalamazoo so that increased production of industrial Panelyte will be possible at Trenton.

St. Regis officials present at the announcement dinner included P. P. Ryan, assistant manager of the Panelyte division; J. E. Kussmann, plant manager of the Panelyte division; N. R. York chief engineer, and H. R. O'Donnell, manufacturing superintendent, both of the Kalamazoo plant; Morlan J. Grandbois, sales manager of commercial printing papers; and Samuel Shane, director of information.

Lee Paper Co. To Add New Fourdrinier

Work on a two-story, 114 ft. by 216 ft. addition to the plant of the Lee Paper Co., Vicksburg, Mich., planned to house a new paper machine, has been started. The building will be ready for the installation of the new fourdrinier in the second quarter of 1951, and production will begin in the last months of that year.

The new fourdrinier will make the mill a three-machine operation. The two machines now in operation are Black-Clawson installations, but as yet the make of the new fourdrinier has not been determined. It will be a 130 in. machine, and will be used, as are the two 120 in. machines now in operation, to make rag content paper and high-grade sulphite pulp specialties.

Sutherland Paper Co. Builds California Converting Plant

Contracts have been let, and construction work begun, on a new converting plant for the Sutherland Paper Co. at Santa Clara, Cal., which will represent an investment of about $1,000,000. The new plant, constructed by Sutherland for the manufacture of "Servisets by Sutherland"—paper cups, plates, napkins, table covers and plastic forks and spoons—will service eleven western states.

The new building will be one story of structural steel, brick and concrete which will provide approximately 1,000,000 sq. ft. of floor space. W. C. Tait Construction Co., San Francisco designers and engineers, have been awarded the contract.

Of the $1,000,000 budget about half will be invested on plant and site, with the other half planned for equipment costs. Work is progressing as rapidly as possible, since present plans are to begin production in about 90 days.

About 150 persons will be employed in the new plant, which will have an annual payroll of near half a million dollars. H. Gordon Hornibrook, a paper converter for many years in the East, has joined the Sutherland organization to manage the plant.

Western Michigan College Students Tour Five Paper Mills

Eleven juniors and sophomores of the Pulp and Paper Technology school of Western Michigan College, accompanied by Dr. Alfred Nadelman, spent the week of June 18 visiting mills in Ontario and Wisconsin.

Mills toured by the students included Abitibi Power and Paper Co., Sault Ste. Marie, Ont.; Rhinelander Paper Co., Rhinelander, Wis.; Marathon Corp., Rothchild, Wis.; Nekoosa-Edwards, Nekoosa and Port Edwards, Wis.; and Kimberly-Clark Corp., Neenah, Wis.

In addition, the future paper men inspected the Trees For Tomorrow, Inc., headquarters at Eagle River, Wis., and inspected the facilities of the Institute of Paper Chemistry, Appleton, Wis. Throughout the tour, special attention was directed to problems of stream improvement and the utilization of waste sulphite liquor.

A REORGANIZATION petition under the bankruptcy laws has been filed by the Empire Pulp & Paper Co., of Marcellus Falls, N.Y. The petition seeks a settlement with creditors on the basis of 15 cents per dollar. Total liabilities are nearly $100,000.

Members of Graphic Arts Research Council witness demonstration for testing printability of paper while on visit to laboratory of Kimberly-Clark Corp. L to R: Dr. M. N. Davis, associate technical director of Kimberly-Clark; Bernard J. Taymans, asst. general manager, Printing Industry of America, Inc.; E. J. Triebe, vice chairman of Research & Engineering Council and general superintendent of Kingsport Press; Frank F. Pfeiffer, Council chairman and vice president of Reynolds and Reynolds; Wm. A. Maull, director of sales service for Mead Corp., and J. Homer Winkler, technical adviser of Batelle Memorial Institute

Kimberly-Clark Entertains Graphic Arts Group

Approximately 50 members of the Research and Engineering Council of the Graphic Arts Industry toured the technical center of Kimberly-Clark Corp. on June 23 and participated in a program of twelve demonstrations and lectures arranged by that company.

The Council, an over-all co-ordinating group of 383 associations, companies and individuals, had just completed its first annual meeting in Milwaukee. It is a relatively new organization that is designed to coordinate and encourage research activity among all elements of the graphic arts industries in the U. S.

Following introductory remarks made by John Catlin, merchandising manager, the Kimberly-Clark program assumed a County Fair pattern. With the emphasis on printing papers, each of a dozen exhibits featured an individual lecture and demonstration by a company scientist. The Council audience, split into small groups, saw such items as a supercalender, basic weight scanner, dirt counter, rotary rupture tester, and a paper customer acceptance laboratory; after which the audience visited the corporation's experimental mill to view other manufacturing exhibits and techniques, including a suction roll silencer, a pilot plant paper coater and a hydraulics exhibit.

Dr. Henry Rothchild, technical director of Kimberly-Clark, concluded the program with a summary of the corporation's research and development activity.

New Paper Dept. at Lowell Inst. Starts With 19 Students

Nineteen students registered for the two week summer course held at Lowell Textile Institute, Lowell, Mass., on "Paper—Its Properties and Uses," held June 5 through June 16. (Cf P.I., June, 1950)

Dr. Geoffrey Broughton, Lowell's Paper Department head, and William Bond Wheelwright, paper authority, were the regular instructors. Assisting in the program as guest lecturers were Professors Gilbert R. Merrill and Chapin A. Harris of the Institute; Paul Brown, production manager of Tileston and Hollingsworth Co.; D. D. Uong, vice president of the Fitchburg Paper Co.; J. F. Wright of Allied Chemical and Dye Corp.; C. S. Proctor, president of Proctor Paper Co.; A. R. Olsen of Potter Press, Inc.; and H. G. Travers of Ludow Manufacturing and Sales Co.

The model fourdrinier machine of American Paper Co. was used for demonstration work, and several films of the various phases of papermaking were contributed by the industry. Students visited Champion-International Paper Co., Lawrence, Mass.; The Wheelwright Division, Mead Corp., Leominster, Mass.; The Dard Hunter Museum of Paper at Massachusetts Institute of Technology, Cambridge, Mass.; The A & P Box factory, and the Courier-Citizen Co. printing plant at Lowell.

The students, twelve of whom were from the papermaking and converting fields, three whose work is in paper merchandising, two who came from allied industries, and two who work in newspaper production, were awarded certificates at the conclusion of the course.

Gair Woodland Tree Farms Certified In Florida and Georgia

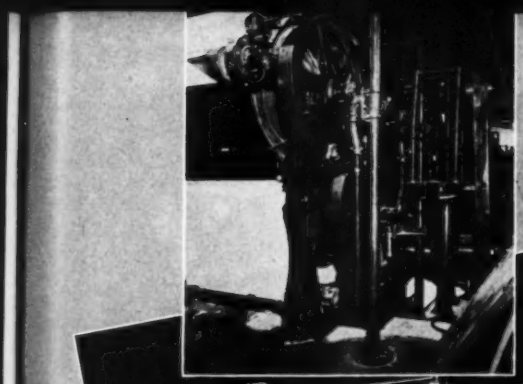
The fifty-ninth Tree Farm certified in Florida is the 32,000 acres of land in Hamilton County owned by Gair Woodlands Corp., Savannah, Ga. Recognition for the active part the Gair company, which supplies all pulpwood required by Southern Paperboard Corp., is taking in the National Tree Farm movement came from the Florida Forest Service, the Southern Pine Association, and the State Chamber of Commerce.

Another Gair Tree Farm recently certified is the 23,315 acres of timberland operated by the company in the southeastern part of North Carolina. Presentation of the North Carolina certificate, for the fifty-fifth such farm approved in the state, was the feature event at a recent Forest Field Day sponsored by the North Carolina Forestry Association and the North Carolina Bankers Association and held at Lake Wacamaw. At the ceremonies, Gair's chief forester, S. A. Boutwell, accepted the certificate for the company from North Carolina's state forester, W. K. Beichler.

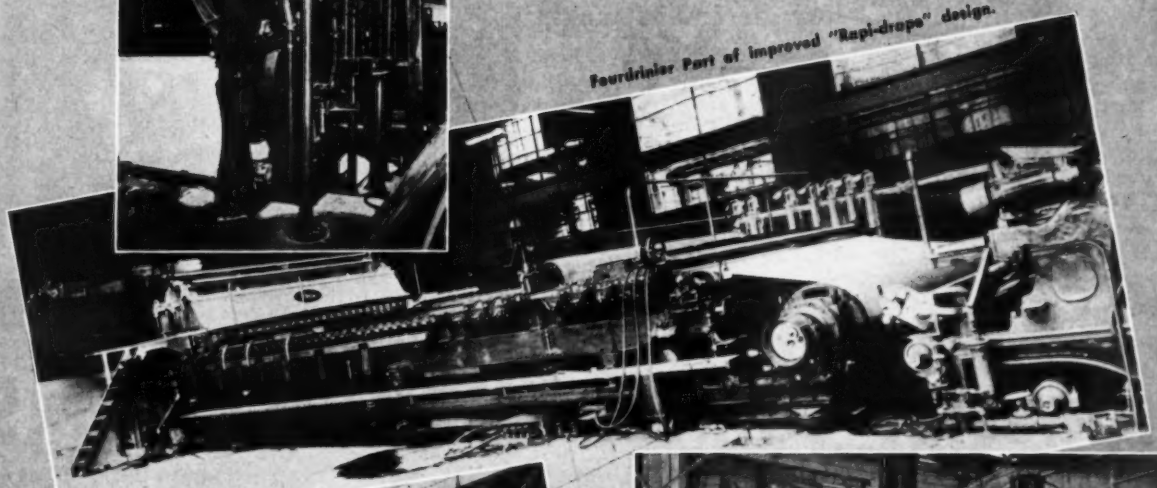
Latest Experiments Offer Hope for Solution of Waste Liquor Problem

Excessive expense seems to be the only drawback to the utilization of a new process of producing wood pulp which would remove the problem of waste liquor residue, and give instead a potentially valuable water-resistant glue as a by-product.

The key chemical, as announced by Bror L. Grondal, professor of forest products and Dr. Piotr Zenczak, research assistant, University of Washington, is triethylene glycol, which closely resembles automobile radiator anti-freeze. Lignin, separated from the wood fiber by the new chemical solvent,

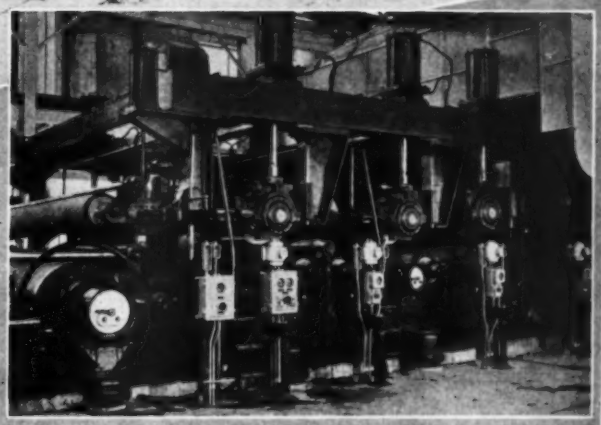


Improved Steam Joint on dry part having open type gearing.



Fourdrinier Part of improved "Rapi-drape" design.

Modern Winder installation.



Simplex Press Part showing improved Lump Breaker and Couch Draw Roll arrangement.

Protect Your Machine Investment

Through Modernization

A paper-making machine must be maintained in peak operating condition to be fully productive and profitable. When maintenance costs become excessive or when a greater range of paper products is required, a well-planned machine modernization program will pay for itself.

Puseyjones engineers have assisted in the rebuilding and modernization of paper-making machines in leading mills, assuring better qualities, higher speeds and bigger profits.

Modernization may call for the addition of a new drive, a new Wet End, a new Press Part, a new Size Press, replacement of inefficient dryers, or the complete rebuilding of the machine itself. Whatever your modernization plans may involve, get the benefits of Puseyjones experience. Talk over your machine rebuilding problems with Puseyjones engineers. Write us today.

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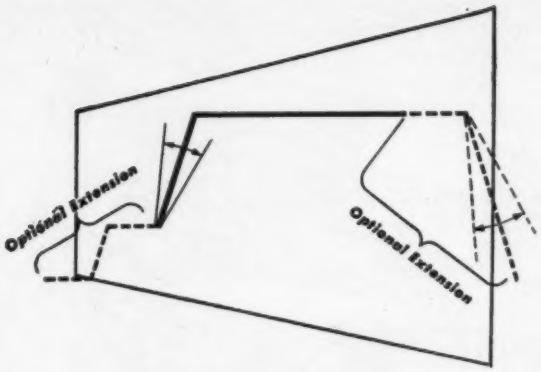
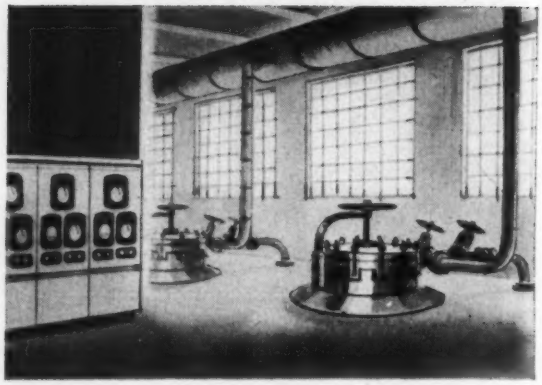
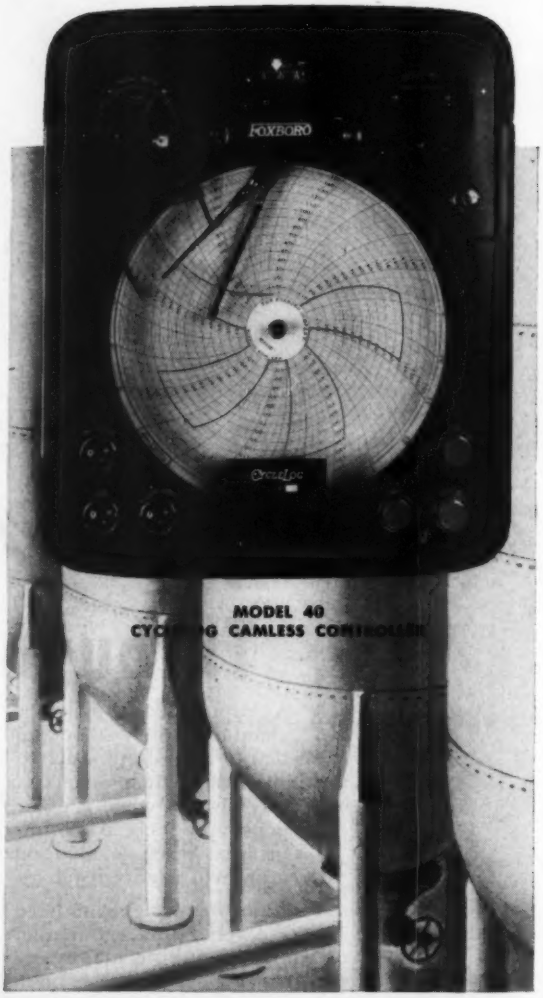
THE SIGN OF TRADE MARK SUPERIOR QUALITY





Digester Control WITHOUT CAMS

Easiest, fastest adjustment for changes in operating conditions



At the simple turn of a knob, you can now shift easily and quickly from one complete cooking schedule to another to compensate for changes in liquor or acid strength, moisture content of the chips, type of pulp desired. *No cams to cut or change.* And established temperature or pressure schedules can be repeated at will, merely by pushing a button!

Other advantages offered by the Model 40 CycleLog Controller include: (1) Controlled rate of rise with stepless dial-selection between 0.5 and 7.0°F. per min. (or between 0.5 and 5.5 psi per min.); (2) holding temperature (or pressure) and time period easily set by convenient knobs; (3) continuous chart record; (4) case-contained push buttons and signal lights simplify installation and reduce panel space.

IN ADDITION — an optional feature of the Model 40 CycleLog Controller establishes a constant base temperature starting point for every cook, (with adjustable holding time) eliminating the effects of variable charging temperatures — a "natural" for sulphite cooking.

Find out more about this revolutionary development for pulp mill operation. Write for Bulletin 438, and talk it over with your Foxboro Field Engineer. **The Foxboro Company, 158 Neponset Ave., Foxboro, Mass., U. S. A.**

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AUTOMATIC DIGESTER CONTROL

produces a thermosetting glue with water-resistant qualities equal to commercial phenolic resin glues.

Since triethylene glycol is an expensive chemical, a less expensive "antifreeze" known as diethylene glycol has been the subject of further experimentation. Thus far, it is believed that while the less expensive chemical also produces a fine pulp, the lignin residue —or glue—is inferior. It is not known how much residue might be recovered from pulp made with either chemical.

The Grondal-Zenczak investigation, although prompted by industry-financed studies, is an entirely independent study of the University of Washington Experiment Station.

Franklin Paper Co. Stops Operations After 86 Years

Operations ceased recently at the 84 year old Franklin Paper Co., Holyoke, Mass., with a resultant dismissal of 60 workers. No plans have been made as yet for disposal of the mill property, according to company President Robert M. Swaney.

It has been definitely stated that the plant will not resume operations as Franklin Paper Co., and it is presumed that the mill will be sold as a going concern if possible or will be otherwise liquidated. Reason given for the shutdown is the current difficulty of operating a small mill at a profit, a condition likely to prevail over a long period of time.

K-C Will Add Fourth Creped Wadding Machine at Memphis Plant

Officials of the Kimberly-Clark Corp. have announced plans for an expansion program in Memphis, Tenn., which will increase that plant's operations about 50 per cent. Including the installation of a third creped wadding machine, the expansion program will cost about $2,000,000.

Actual construction will begin in about a month, and should be completed within a year. Since a fourth machine eventually may be needed if demand for company products continues, building operations will be arranged so that there will be room for further expansion at a later date.

The plant has been in Memphis since 1946, when it took over a former aircraft parts factory. It began with an employment of 350 persons; the present expansion will add 250 persons to the corporation's current two and a half million dollar payroll. Production will be increased from 90 to 140 tons of creped wadding a day.

Research League to Conduct Further Research on Mill Effluent at Rhinelander

▶▶▶ MAJOR INCREASES in Wisconsin pulp mills' search for ways to reduce spent sulphite liquor pollution of the state's waters were announced today by the Sulphite Pulp Manufacturers' Research League.

Already in operation are the League's eleven-year-old laboratory and pilot plant program at Appleton and the commercial-scale experimental plant that makes dried torula yeast at Rhinelander. (Cf. P.I., March, 1950)

To supplement these activities, three Wisconsin paper companies which are currently engaged in large programs on mill waste treatment have agreed that findings to be achieved in their own individual research and development work in this field will be made freely available to all League members. The three companies thus offering the results from their new programs are Hoberg Paper Mills Inc., Northern Paper Mills and Rhinelander Paper Mills.

Since Nov., 1948, the yeast plant jointly owned by the League membership has been processing spent liquor from the Rhinelander Paper Co. sulphite mill, which it adjoins. The process converts the wood sugars to high-vitamin yeast, which is dried and sold for poultry and animal feeds. Removing these sugars reduces the oxygen-consuming character of the effluent in the stream.

Now Rhinelander Paper Co. is negotiating for evaporator equipment. When this new equipment is delivered, it will be used to evaporate both effluent from the yeast plant and spent liquor from the pulp mill. Meanwhile, the company is developing markets for the dried solids.

To operate this experimental and development program on mill effluents, Jesse M. Holderby of Appleton on July 1 joins the technical staff of Rhinelander Paper Co. He has for eleven years been research co-ordinator of the Sulphite League at Appleton, and general manager of the Rhinelander yeast plant since it was built.

"This represents a major step-up in the Wisconsin Sulphite industry's persistent battle to find commercially practical ways to overcome water pollution," declares Folke Becker, president of Rhinelander Paper Co. and vice-chairman of the Sulphite League. "Holderby will continue to manage the yeast plant, and will work on other phases of how to solve one mill's pollution problem. Whatever of value he and his associates learn about waste treatment at the expense of our company, will be put at the disposal of all League members. Also, of course, he will continue in regular consultation with League officials."

Hoberg Paper Mills Inc. and Northern Paper Mills, both of Green Bay, are currently engineering sets of alternative plans for treating the spent sulphite liquor output of their pulp mills. One plan is for using the torula yeast process, the other for evaporating most of the water and burning the residue as fuel. Whatever plans will be submitted to the state authorities by each company for approval at the end of 1950 depends upon developments meanwhile.

"Industry chemists and engineers are confident that such a plant as we are planning may make important discoveries leading toward successful commercial use of the process," explains J. M. Conway, president of Hoberg and chairman of the Sulphite League. "Hoberg's purpose is to work out ways to reduce sulphite pollution. For this reason we have agreed to give our findings in this field free of cost to all of the companies who co-operatively maintain the League's research."

"Our company's technical and engineering departments have been concentrating their activities on evaporation and burning of spent sulphite liquor and developments in our new program will be available to the League," says Milan Boex, president of Northern.

Averill J. Wiley of Appleton, technical director, takes over responsibility for the League's activities. Groff Collett of Appleton, who has served as Holderby's executive assistant, becomes business manager. Officers of the Sulphite League point out that these moves will strengthen the League's development activities. Meanwhile, its established program will continue on the same scale as before.

Dallas, Tex. To Be Site of New United States Envelope Plant

On a site selected by E. V. Johnson, company president, United States Envelope Co., Springfield, Mass., will build at Dallas Tex., a $1,000,000 manufacturing plant.

The plant, which will employ between 150 and 200 persons, will cover a six-acre tract of land and will produce envelopes for business and social purposes as well as paper water cups. Company customers in Texas, Oklahoma, Louisiana, Arkansas, New Mexico, Colorado, and parts of Kansas and Missouri will be serviced from the new plant.

Dexter Sulphite Plans Import of Pulpwood by Steamship

Incorporated under New York state laws to bring in by steamship from Canada to Black River Bay the annual supply of pulpwood for Dexter Sulphite Pulp & Paper Co., Dexter, N. Y., is Dexter Wood Import Co.

Estimates are that the first of such importation about 25,000 cords of Canadian pulpwood from Quebec and New Brunswick will be transported annually. Ultimately, if the project is satisfactory, from 50,000 to 60,000 cords are expected to be brought to Dexter by steamship, resulting in a considerable annual transportation cost reduction.

Lee Paper Co. to Sponsor Scholarship at WMC

A scholarship in pulp and paper technology, to be awarded to a high school senior from Vicksburg, Mich., who enrolls in the new pulp and paper technology curriculum at Western Michigan College, Kalamazoo, has been announced by the Lee Paper Co., Vicksburg.

The scholarship, according to Maxwell D. Bardeen, company president, will total $200 annually for the student, and will be renewable for three successive years provided the student maintains a required scholastic record.

Further scholarships will be awarded for similar amounts to Vicksburg seniors during each of the next three years; four scholarships will be provided by 1953, for a total of $800 each for the four years required for the course.

Selection of students for the awards is to be made by a committee yet to be chosen which will include a representative of the Lee Paper Co., a Vicksburg high school official, and a Western Michigan College representative.

Container & Storage Cos. Taken Over By Jackson Box Co.

All capital stock of Durham Container Co. and Southern Storage and Distribution Co., both of Durham, N. C., has been acquired by The Jackson Box Co., Norwood, Cincinnati, Ohio, at an amount reported to involve about $1,000,000, exclusive of the 45 per cent interest held since 1946 in the two concerns.

The newly acquired companies, which employ about 280 persons, will remain intact, according to W. J. Cassady, Jr., president of the Jackson firm, who was recently elected president of the two acquired companies. Ownership was purchased from Menasha Woodenware Co., Menasha, Wis.

Both The Jackson Box Co. and Durham Container Co. manufacture corrugated shipping containers; Southern Storage and Distribution handles cotton and tobacco storage in addition to the operation of a fleet of trucks in the southeastern part of the country.

Demonstrations of Paper Made by Hand Given by Harrison Elliott

At the Old Sturbridge Village Museum and Crafts Center, Sturbridge, Mass., Harrison Elliott, well known for his hobby of making paper by hand, has been giving demonstrations of the craft in the Village Printing Shop.

Old Sturbridge Village is a living museum and crafts center where visitors may learn the arts and skills of their forefathers. There are 30 shops, mills, houses, a church and general store. It was started in a small way during the year 1936, but interest in the project grew and it was opened to the public in June, 1946.

Harrison Elliott lifts mold from vat while demonstrating the making of paper by hand. Details of Mr. Elliott's craft have been published from time to time in this magazine

Mr. Elliott is associated with paper manufacturing professionally, and he has presented his program to art and printing classes of Columbia and Pratt University in New York, as well as before the Orlando (Fla.) Art Association. He will make return demonstrations at the Museum before the season ends in October.

Beloit Underwrites 1st Scholarship at U. of Me. Foundation

The new Pulp and Paper Foundation of the University of Maine, first announced in February at a luncheon meeting of Maine Pulp and Paper Alumni in New York, is receiving fine support from the industry, its affiliates, suppliers and key personnel.

The first scholarship for the new Foundation has already been underwritten by Beloit Iron Works, Beloit, Wis.; the first company membership has been subscribed by General Dyestuff Corp., New York; the first paper company membership has been taken by Great Northern Paper Co.; and the first individual membership has gone to Theodore W. Prescott, assistant advertising manager of Scott Paper Co., Chester, Pa.

Regional committees for the promotion of the Foundation at the University of Maine, which fosters a six-point program designed to increase the university's training and research programs and attract young men to develop for ultimate management responsibilities, are now being established. T. G. Mangan, manager of Maine mills for International Paper Co., and chairman of the membership committee, has named his committee. W. E. Parsons, vice president of Keyes Fiber Co., will have the Maine territory; D. D. Uong, vice president in charge of engineering and research for Fitchburg Paper Co., is in charge of the Massachusetts territory; Walter A. Littlefield, manager of product control and market analysis for Brown Co., is responsible for New York City. P. S. Bolton, research director of Robert Gair Co., Inc., has been named chairman for individual memberships.

P & P Research Institute Elects New Board— Plans Expansion

The intention to expand the research activities and the graduate training program of the Pulp and Paper Research Institute of Canada was emphasized with the appointment and first meeting of the Institute's new board of directors recently.

Following the granting of a federal charter to the Institute, the new board, representing the government, industry and McGill University, with which the Institute collaborates for graduate studies, was chosen. The new board, replacing the Joint Administration Committee, will supervise the intensification of research and expand graduate level study.

Newly-elected Chairman of the Board R. L. Weldon, president of Bathurst Power and Paper Co., Ltd.,

STREAM POLLUTION ABATEMENT?
FIBRE RECOVERY?

Check the CYCLATOR®

Here's what we've done at the River Raisin Paper Company plant in Monroe, Michigan. A CYCLATOR is treating white water from two cylinder machines producing liner board. B.O.D. reduction averages 52.4%!* Suspended solids are reduced 99.0%!* In addition to these positive stream pollution abatement steps, fibre losses have been reduced to 0.1%* by reusing the underflow which has a consistency as high as 2.5%.* The value of the recovered fibres defrays a high percentage of the operating costs. If white water, stream pollution abatement and fibre recovery are among *your* problems, put them up to INFILCO! Send today for our Bulletins No. W850, 23-409, and other pertinent data.

A FEW INFILCO WHITE WATER TREATMENT PLANTS

CAROLINA PAPER BOARD CO.	Charlotte, N. C.
CONTINENTAL DIAMOND FIBRE CO.	Bridgeport, Pa.
FEDERAL PAPER BOARD CO.	Reading, Pa.
W. C. HAMILTON & SONS CO.	Miquon, Pa.
NEW YORK & PENNSYLVANIA CO.	Johnsonburg, Pa.
RIVER RAISIN PAPER CO.	Monroe, Mich.
TAYLOR FIBRE CO.	Betzwood, Pa.
AMERICAN DEFIBRATOR CO.	Mexico City, Mex.

**Michigan Stream Control Commission Report, March, 1949*

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WORLD'S LEADING MANUFACTURERS OF WATER CONDITIONING AND WASTE TREATING EQUIPMENT

Montreal, was formerly chairman of the Joint Committee. Board members representing the government will be Dr. H. L. Keenleyside, deputy minister of Resources and Development; and D. A. Macdonald, director of the forestry branch of the Department of Resources and Development, Ottawa. McGill University has chosen Dr. F. Cyril James, principal and vice-chancellor of the university; B. C. Gardner, president of the Bank of Montreal; and S. G. Dobson, chairman of the board of the Royal Bank of Canada, Montreal, as its representatives. Montreal industrial figures on the board in addition to Mr. Weldon include D. W. Ambridge, president of Abitibi Power and Paper Co., Ltd., Toronto; S. L. deCarteret, president of Canadian International Paper Co.; E. H. Smith, president of Howard Smith Paper Mills Ltd.; R. M. Fowler, president of the Canadian Pulp and Paper Association; and Dr. L. R. Thiesmeyer, president of the Institute.

Eleven Paper Mills Form Co-op Group to Study Forestry Problems

Eleven paper mills have formed a broad industrial co-operative program of research into several fields brought to attention by studies on hypoxylon canker, the chief disease hazard to growth of Aspen.

Increased interest in Aspen as a pulping species led to investigations on canker about a year ago in Michigan and Wisconsin, when Dr. Hansbrough of the Bureau of Plant Industry, supported by the services of company foresters of Northern Paper Mills, Consolidated Water Power and Paper Co., Nekoosa-Edwards Paper Co., Kimberly-Clark Corp., and The Mead Paper Co., began work.

At a subsequent meeting these mills and seven others including Marathon Corp., Flambeau Paper Co., Rhinelander Paper Co., Escanaba Paper Co., National Container Corp., The Northwest Paper Co., and Minnesota and Ontario Paper Co., conceived a broader plan for over-all research covering silvicultural and management problems of all species.

By using company foresters the necessity of appropriations or emergency requests for financial support will be removed. Experiments requested by individual companies will be included into the over-all plan; woods personnel will be trained.

Bruce Buell is chairman of the steering committee which includes Stanley Hurd of Consolidated Water Power and Paper Co.; F. G. Kilp, Nekoosa-Edwards Co.; W . H. Hildebrand, Mead Paper Co.; and Ed Janowski, Northwest Paper Co. These men will guide projects this year in study on hypoxylon canker, reproduction of timber in coniferous swamps, and experiments in discing poorly stocked lands to promote better reproduction.

WORK HAS BEGUN ON A program of modernization at the Moss Point, Miss., mill of the International Paper Co., which will include installation of a new soda recovery boiler and an addition of a 7500 kw. turbogenerator to the power system. Cost of the improvement, which should be completed by February, 1951, was not revealed.

AN APPEAL MADE BY The Mead Corp., Chillicothe, Ohio, from sales and use tax assessments on equipment used in company wood seasoning operations was upheld by the Ohio Supreme Court recently. Taxes totaling $1,881.52 had been made on purchases of a Diesel engine, trucks, and an overhead crane. The supreme court held that all the items except the crane were used directly in the manufacturing process, since they were needed for the storage of logs and wood pulp for seasoning before manufacturing, and thus were exempt from sales and use taxes.

CERTIFICATION OF 76 well-managed and privately owned forest areas totaling 4199 acres made Minnesota the nation's twenty-eighth Tree Farm state on June 17. Ceremonies opening the Tree Farm program were held on that date at Boy Scout Camp Lawrie, and were attended by representatives of the Minnesota conservation department, forest industries, and the Keep Minnesota Green committee.

ANOTHER MOVE TO FOSTER forest conservation has been taken by the Brown Company of Berlin, N.H., which has arranged to give woodland owners a few young trees for each tree cut for pulpwood. This amounts to a gift of 4,000 young trees for each 500 cords of pulpwood sold.

ACCELERATION OF retirement of funded debts of Celanese Corporation of America is being accomplished by authorization of directors to redeem on Aug. 1 $5,000,000 principal amount of debentures over and above the normal annual retirement effected through operation of the sinking funds. Of the $5,000,000 of debt to be redeemed, $3,000,000 is to be applied to the 3 percent debentures due in 1965, and $2,000,000 is to be applied to the 2.85 per cent debentures due in 1966.

Bemis Bro. History Told in New Booklet

In commemoration of the fiftieth anniversary of Bemis Bro. Bag Co., Bemis, Tenn., company officials have had printed a gold and white brochure entitled "Fifty Years in the Life of a Community."

The booklet traces the history of Bemis Brothers, its workers and officials, as well as its town, through the years, and is illustrated with numerous pictures of early Bemis officials, employees, plant, and town homes. Present day conditions, as shown by recent photos of the same town, are a commendable achievement.

A TEMPORARY SHUTDOWN May 26 at Dexter Sulphite Pulp and Paper Co., Dexter, N.Y., permitted modernization of the mill's wood room. New conveyors, as well as new facilities in the chipping section, were installed by the plant's maintenance crew.

AN INDUSTRIAL TOUR OF National Container Corp., Jacksonville, Fla., was made recently by members of the Jacksonville Ad Club. Company Vice President Albert H. Edwards was in charge of the tour, made by small groups of the club members throughout the entire manufacturing process. After completing the tour, the visitors were guests of the company at the National Container Corp. canteen.

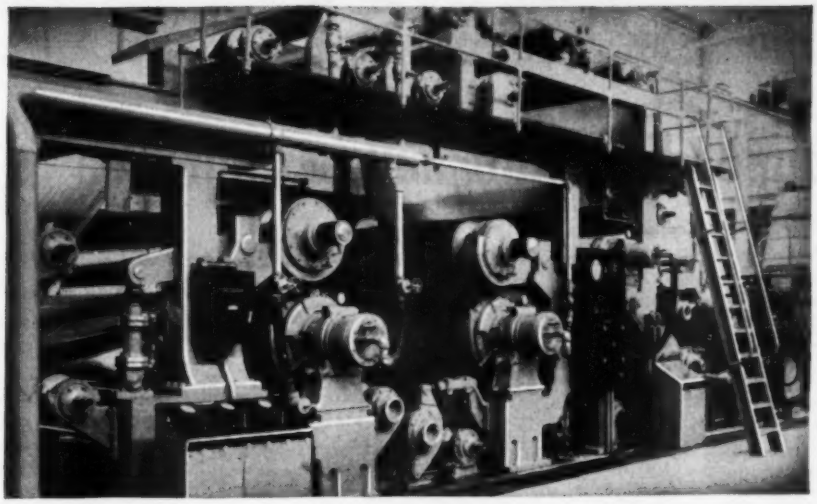
MODERNIZATION OF THE Vincennes, Ind., plant of Pomeroy Manufacturing Co. will cost an estimated $165,000.

FREE GIFTS OF TREE planting stock will be given by the Brown Co., Berlin, N.H., to all producers selling pulpwood to the firm. The stock will be distributed on the basis of one tree for each tree purchased by the Brown firm in the form of pulpwood—a producer supplying 500 cords of pulpwood would be entitled to 4000 free trees. Brown Co. pulpwood buyers are also giving personal attention to woodland owners, including timber marking and advice on tree planting, to assure maximum productivity.

TITLE TO PROPERTY and operation of The Claremont Paper Mill, Claremont, N. J., has been acquired by Bemis Bro. Bag Co., St. Louis. W. A. Kirn, Sr., who has headed Claremont for many years, will remain as manager for Bemis. The Claremont mill produces kraft paper specialties.

CRAFTSMANSHIP

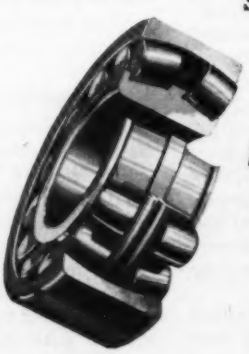
READY FOR THE BIG SQUEE-E-E-ZE



bearings engineered by SKF

The press section of Rice Barton Corporation's giant paper machine, installed at the Brown Company, Berlin, N. H. plant, builds up extra-heavy loads on the upper press rolls . . . and puts a heavy tax on the bearings. To bear the brunt of extra-heavy service, to insure smooth, trouble-free operation at all times, Rice Barton installed 36 SKF Spherical Roller Bearings and 2 SKF Double Row, Deep Groove Ball Bearings on this huge machine. Requiring minimum maintenance, time-proved in installations of every type and size, SKF Bearings are the logical choice for efficiency. SKF INDUSTRIES, INC., PHILADELPHIA 32, PA., *the Pioneers of the Deep Groove Ball Bearing, Spherical Roller Bearing, Self-Aligning Ball Bearing.*

7125



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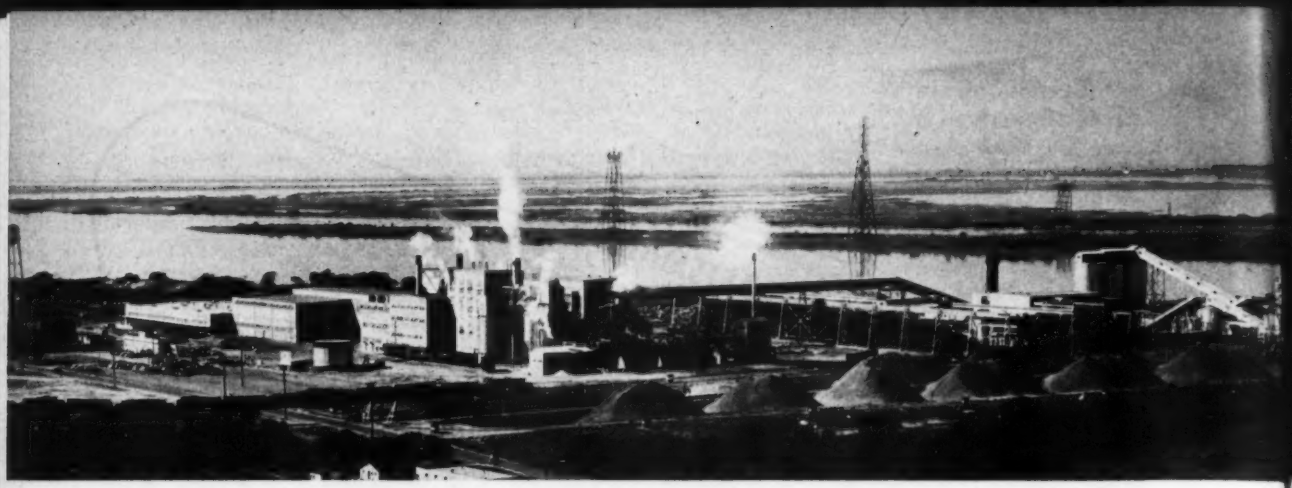
BALL AND ROLLER BEARINGS

8 REASONS WHY SKF IS PREFERRED BY ALL INDUSTRY

Integrity · Metallurgy · Tolerance Control · Surface Finish · Product Uniformity · Engineering Service · Field Service



Located on the San Joaquin River, Fibreboard's new mill is strategically situated with respect to its own converting plants and to the market for its finished cartons and packages

Fibreboard builds first kraft mill in California

RICHARD W. PORTER
Editorial Director, The Paper Industry

Bleached kraft and semichemical pulp are produced and made into paperboard. The new plant is designed for utilization of all types of wood mill waste and is integrated with the scientifically managed forestry operations of company owned timberland.

▶▶▶ A MAJOR GOAL in Fibreboard's $50,000,000 postwar improvement and expansion program has been realized with the completion of its new San Joaquin Division board mill. Now one of the largest producers and converters of paperboard packaging materials in the country, the company added over 250 tons to its daily production capacity when it started this operation a few months ago.

Located on the San Joaquin River at East Antioch, this is the only chemical pulp mill in California. Establishment of this new industry represents a significant step in the progress toward greater utilization of the wood resources of this state. Furthermore, it makes an important contribution to the community by creating employment and payrolls for some 400 persons with an additional 350 new jobs in woods operations.

The San Joaquin Division mill was planned and built under the direction of N. M. Brisbois, vice president of Fibreboard Products, Inc., and Leland S. Rosener, consulting engineer. E. W. Erickson, formerly of the Crown Zellerbach Corp., Port Townsend Division, was resident consultant during construction and start up of the new mill. C. M. Stitt was resident manager during construction but he now heads up the newly created Fibreboard Central Engineering Division. Top responsibility for operation lies with R. E. Bundy, vice president in charge of production for Fibreboard. Resident manager of the San Joaquin Division is C. R. P. Cash. General contractor responsible for construction of the mill was Swinerton and Walberg, San Francisco.

Bleached kraft food container board, 9 pt. "Tuf-Fir" corrugating medium, and a small tonnage of unbleached kraft pulp are produced in the new plant. Most of the output goes to other Fibreboard plants for further processing and conversion to finished cartons and packages. From wood source to finished products the kraft operations and semichemical processing are almost entirely separate.

Products and Processes

Food Container Board is made from 100 per cent bleached kraft pulp. Fir logs are barked hydraulically and chipped. Bleached kraft is processed in the conventional manner. Chips are cooked by the sulphate process, washed, screened, bleached and refined before being made into board on a cylinder-type paper machine.

Corrugating Board is made from 100 per cent semichemical kraft pulp produced from sawmill and box factory waste wood. Chips are cooked with sulphate liquor in a continuous digester and defibered (Asplund process). Brown stock is refined while hot, washed, further refined and then made into 9 pt. corrugating medium on a fourdrinier paper machine. Cooking liquor is the same as that used by the kraft mill. Unlike most commercial semichemical processes, the waste black liquor is evaporated and burned in the same chemical recovery system used for black liquor from the kraft mill.

Numerous other innovations feature the new mill and some of these are herein noted. Outside storage of wood chips with subsequent washing prior to use. Whole log chipper driven by a steam turbine—first such installation on record. Pulping of waste wood such as kiln dried mill ends and planer mill waste—such material was formerly burned. Hot brown stock refining—this is one of a growing number of pulp mills to refine stock in presence of spent cooking liquor. Man-lift elevator installed in digester building saves time and increases efficiency of operators—this type of elevator is common in many industries but uncommon in the paper industry.

One of the most important functions in a modern pulp and paper mill is that of process control. Here, over 150 instruments for measuring, indicating, recording and controlling are installed. Throughout the mill Brown instruments, control panels and consoles are much in evidence since this company furnished instruments for practically all departments. Other instruments found in the mill are Foxboro, Mason-Neilan, Bailey, Fischer & Porter, Leeds & Northrup.

Water supply

Daily consumption of water is over 14 million gallons. A large pump house at the edge of the San Joaquin River houses the water pumping equipment. This includes some 25 De Laval pumps for raw water supply, condenser cooling water, mill supply, shower service, and fire protection. Several of the pumps are driven by G-E steam turbines.

Raw water is treated with alum and

Fir logs are stored under this 100 ft. wide craneway adjacent to wood mill. Note bark incinerator and water clarifier

Food container board is made on Black-Clawson cylinder machine (L); 9 pt. is made on Pusey & Jones fourdrinier (R)

activated sodium silicate in a Dorrco Clariflocculator. Around this 150-ft. diameter tank was built an 18-ft. wide annular reservoir tank to receive the treated water. Total diameter of the Clariflocculator plus the peripheral tank is 186 ft.

Water-treating chemicals are automatically proportioned by two Milton Roy Duplex pumps in conjunction with Bailey electronic flow meters and G-E Thymotrol controls. Treated water that is used in the condensers of the power turbines, is re-used in the mill.

Effluent disposal

All mill effluent flows to a sump at the pump house from which it is pumped by a battery of four Fairbanks-Morse trash pumps through submerged pipe lines to the middle of the river to insure rapid dilution. Stream pollution is minimized by automaticaly controlling the *p*H of the effluent by adding neutralizing chemicals.

Fire protection

In addition to two De Laval pumps (one of them driven by a Waukesha gas engine) three Fairbanks-Morse pumps are also used for this service. A Viking sprinkler system is installed in the mill, and it is supplied from a 125 ft. high 100,000-gal. water tank built by Chicago Bridge and Iron Co.

Steam and power

Two Babcock & Wilcox power boilers and one B & W Tomlinson recovery furnace generate the steam for the power turbines and for process use. The power boilers are two-drum units of the integral furnace design arranged for either oil or natural gas firing. They are equipped with tubular air heaters and Diamond soot blowers. Characteristics of each of the power boilers are as follows: maximum continuous capacity, 160,000 lb. per hr.; design pressure, 650 psi; operating pressure, 600 psi; steam temperature, 700 F.

The recovery unit is the two-drum type with superheater, economizer, and tubular air heater; it produces about 100,000 lb. of steam per hour at 600 psi operating pressure and 700 F. Boiler feed water is treated in a Permutit system.

Bailey instruments and controls are installed on both power boilers and recovery furnace. These include air-operated combustion control, furnace draft control, steam and flow control for oil firing, gas and air flow control for actual gas firing, and feed water control. A Bailey boiler meter is installed on the recovery furnace to record steam and air flow, steam temperature and pressure, and to totalize the steam flow. In addition, Bailey desuperheaters and controls are employed for the 25, 45, 50 and 150 lb. desuperheater stations. Leeds and Northrup Micromax recorders for CO_2 and for conductivity are employed in the power plant. Brown recording and integrating electric flowmeters are employed as accounting meters to totalize the steam consumption of the various departments. All three B & W boilers were installed by C. C. Moore & Co.

Three 5,000 kv-a General Electric turbine generators develop the entire electrical energy requirements for the plant. A number of 500 kv-a G-E unit substations are included in the power distribution system. Westinghouse supplied 15-4,000 v. metal-clad switch gear units, a 1500 kv-a Inerteen immersed, three-phase power center, and a 750 kv-a oil-insulated three-phase transformer. Most of the 4,000 v. switch gear and controls are Westinghouse, while most of the 440 v. equipment is G-E.

Wood supply

Two major sources supply wood to the new Fibreboard mill. Waste wood from nearby saw mills, planer mills, and box factories, comprise most of the wood used for the semichemical pulp mill. Fibreboard has built complete chipping plants at a number of sawmills to utilize slabs and wood waste formerly destroyed by burning.

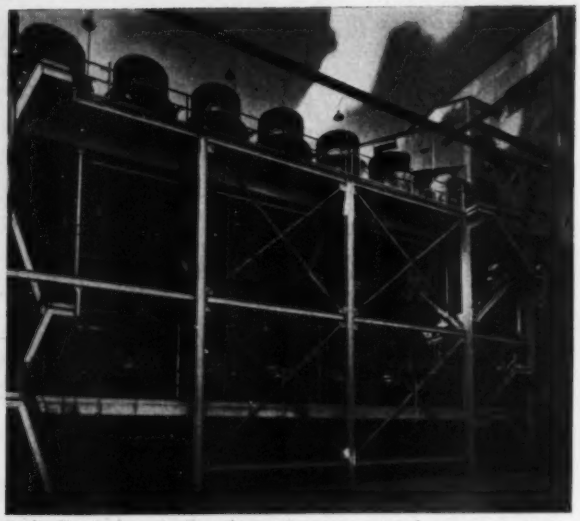
For the bleached kraft operations fir of various species is used. At present, Douglas fir logs are purchased and brought in by rail from northern California and southern Oregon, while red and white fir will be obtained from the company's own woodlands. Much of the wood will be cut under a scientific conservation program for a perpetual timber supply on the 75,000 acres which Fibreboard recently purchased in the area of Placer, Nev., and Truckee, Calif. Hobart Mills is the headquarters for logging operations. Logs suitable for lumber will be sent to sawmills.

Two separate wood-handling and processing systems are employed, since wood quality requirements of the two pulping processes are different.

Wood for Semichemical

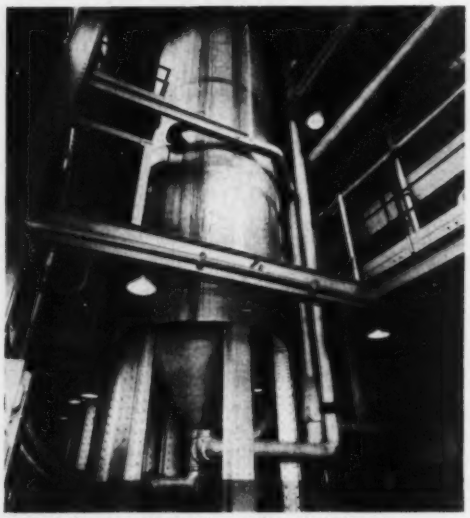
Chips from the saw mill chipping plants are received in open railroad cars and are unloaded by a Sutorbilt Corp. gantry-type pneumatic conveying system and discharged into two parallel excavated trenches, 75 to 100 ft. wide, about 20 ft deep, and over 1500 ft. long. The railroad track runs between the two trenches, and the unloading unit runs on tracks that straddle the railroad cars.

The same unit is employed to reclaim chips from storage. A suction pipe extends out to the middle of both piles, and a bulldozer is used to push the chips to the suction pipe. They are then discharged to electrically operated hopper cars that shuttle back and forth from the unloader to a track hopper. Chips from the track hopper are taken by flight conveyor and belt conveyor to one of the

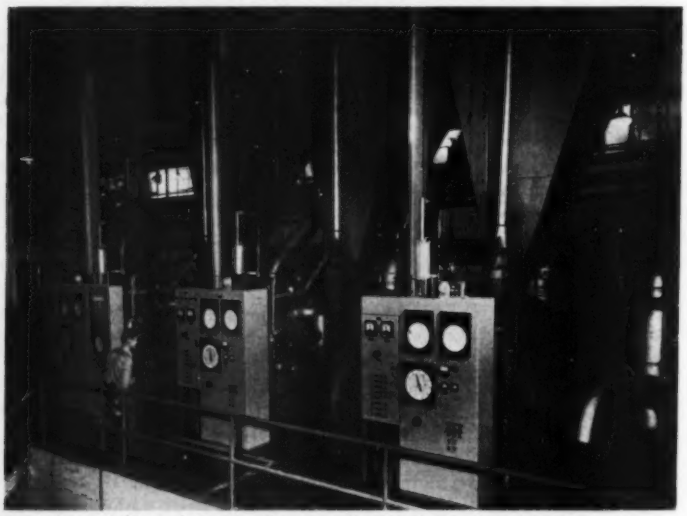


Goslin-Birmingham 6-effect long-tube evaporator for concentrating both kraft and semichemical black liquor

Dorr causticizing plant and Allis-Chalmers lime recovery kiln; unhoused units save building costs

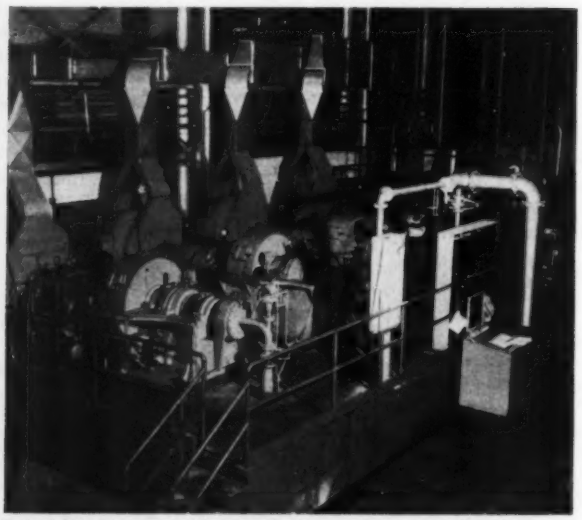


One of three A. O. Smith stainless-clad digesters with Esco heaters and Yarway blow valves



Control panel (Brown) for the three continuous Chemipulper digesters; individual hoppers supply chips to the reaction chamber feeders

Impco washer systems: bleach plant washers (foreground), 4-stage kraft brown stock washers and 2-stage semichemical washers



Sutherland refiners on bleached kraft; consistency regulated by De Zurik unit (back). Note air-cooled motors

10,000 cu. ft. steel storage silos each equipped with Link-Belt rotary plate feeders.

Waste mill ends and trimmings from the planer mills and box factories are received in side-delivery hopper cars. These dump directly onto a belt conveyor which takes them to a storage hopper. This wood is then reduced to stringy, sliver-like chips by a large Williams hog-type hammermill. These chips or crushed wood waste go to one of the silos.

Crushed wood waste and chips are proportioned about equally onto a belt conveyor leading to the screen room. Here, Sumner chip screens remove the oversize chips, which are sent to a small hammermill for further reduction before they are returned to the system. Screened chips then go to a storage silo.

Blended chips from storage are conveyed to two Link-Belt sloping screw conveyor type chip washers to remove sand and dirt adhering to the chips from outdoor storage. The chip washers discharge to Tyler screens, and the clean chips are conveyed direct to the feed hoppers of the three continuous Chemi-pulpers.

Water containing dirt and fine sawdust goes to a Dorr thickener where the water is clarified for reuse in the chip washers.

Wood for bleached kraft

Fir logs, received by rail, are unloaded by an overhead 100 foot span P & H bridge crane on 50 ft. high elevated tracks. The craneway is adjacent to the wood mill and extends over 200 yards from the car tracks over the log deck into the mill yard, thus providing storage for over four million board feet of logs.

Logs are transferred from the log deck to a log haul chain which takes them into the wood mill. They are cut into 20-ft. lengths, and are then sent to the hydraulic barker. Water for the Bellingham type hydraulic barker, is provided by two turbine-driven Byron Jackson six-stage pumps, each with a capacity of 600 gpm at 1200 psi. Bark and wood waste are freed of water and conveyed to an incinerator where they are burned without heat recovery.

With bark removed, logs up to 42 inches diameter are sent direct to the 175-inch diameter, four-knife Sumner chipper direct driven by a 2500 hp. G-E steam turbine through a Farrel-Birmingham gear reduction set, which also drives an air compressor. High pressure steam runs the turbine, and the low pressure exhaust steam goes into the process steam lines. This is the first application on record in which a chipper has been powered by a steam turbine.

Large logs over 42 inches diameter are split up by a 9-ft. band mill and are

T. R. Bland
President,
Fibreboard Products Inc.

C. M. Stitt
Manager, Central
Engineering Div.

R. E. Bundy
V.P. in charge
of production

C.R.P. Cash
Manager, San
Joaquin Div.

What's What About Fibreboard

Here is a summary of salient statistics regarding Fibreboard Products, Inc., 1789 Montgomery St., San Francisco, Calif.

What are the products?

The company is engaged in the manufacture of chemical, semichemical, and mechanical pulp, all grades of paperboard, and the fabrication of folding boxes, cartons, ice cream pails, paper tubes and cans, fiber wallboard, egg case fillers, corrugated and solid fiber shipping cases, and other paperboard products. Plants have a daily output slightly in excess of 1,000 tons of paperboard.

Where are the mills?

Properties owned by the company consist principally of mills, equipment and timber lands as follows: Paperboard mills at Stockton, Antioch, East Antioch, Los Angeles (Vernon), Calif., and at Port Angeles and Sumner, Wash.; converting plants at Stockton, Antioch, South Gate, San Francisco and Los Angeles (Vernon), Calif., at Sumner, Wash., and at Portland, Ore. Extensive timber holdings consisting of over 80,000 acres in the vicinity of Hobart Mills, Calif., and on the Olympic Peninsula, Wash.

What subsidiaries?

The company owns all of the capital stock of the following companies: Independent Paper Stock Co., a paper collecting company operating in California, Oregon, and Washington; Federal Container Co., manufacturing corrugated shipping containers and packaging materials at Philadelphia, Pa.; The Maryland Container Co., manufacturing folding cartons and corrugated shipping containers at Baltimore, Md.; Glass Containers, Inc., operating glass container manufacturing plants at Los Angeles and Antioch, Calif.; Nevada Silica Sand, Inc., engaged in the mining and refining of silica sand at Overton, Nevada; Container Transport Co., operating a fleet of trucks in the area of Los Angeles, Calif.; Precision Electrotype Co., manufacturing electrotypes, rubber dies, etc., at San Francisco, Calif.

Who are the owners?

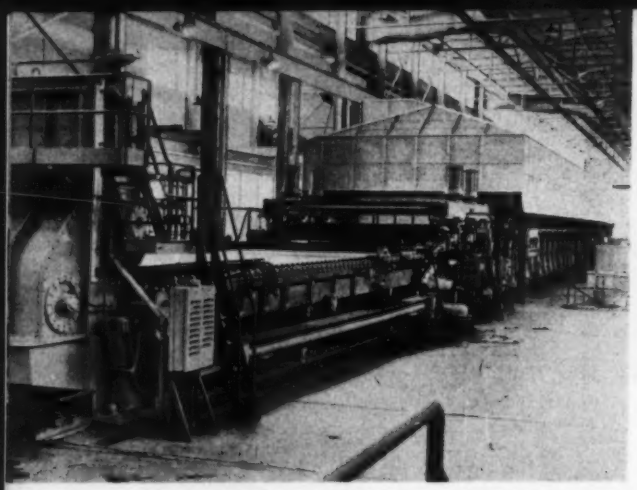
The company was incorporated in Delaware, September 26, 1927, to acquire and operate certain properties previously owned and operated by The Paraffine Companies, Inc., and by Crown Zellerbach Corp. (Jointly controlled by these two companies.)

Who runs the business?

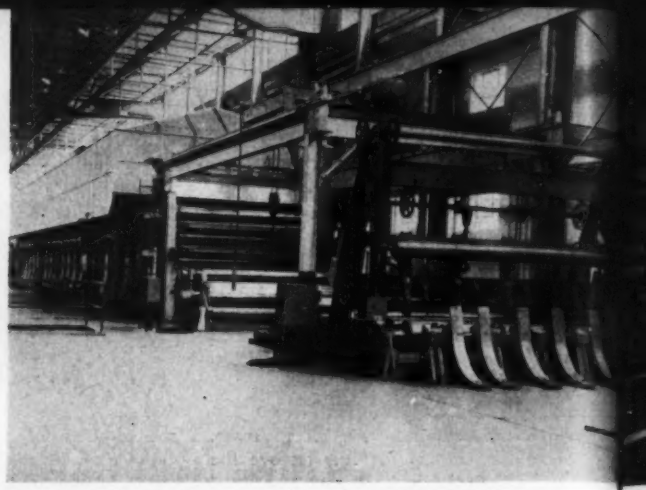
Officers—J. D. Zellerbach, chairman of the board; T. N. Bland, president; R. E. Bundy, vice president in charge of production; E. J. Farina, vice president in charge of sales; R. B. Knott, vice president in charge of finance; N. M. Brisbois, vice president and operating consultant; B. R. Colkett, secretary; J. F. Garvin, treasurer; J. F. Thompson, comptroller; R. M. Cotner, assistant secretary and assistant treasurer; D. Hanson, assistant secretary and assistant treasurer; H. L. Stilwell, assistant secretary.

Directors—T. N. Bland, Louis Bloch, C. C. Gibson, A. B. Layton, W. H. Lowe, R. A. McDonald, D. H. Patterson, Jr., Herman Phleger, R. S. Shainwald, H. L. Zellerbach, J. D. Zellerbach.

Employees—Over 5000 persons are employed by the company and its subsidiaries.



Pusey & Jones 156 in. wide fourdrinier wet end with neoprene lined flow spreader inlet and head box



9 pt. corrugating medium is reeled up then made into rolls on the Pusey & Jones rewinder

then chipped in the Sumner 84-inch diameter six-knife chipper, driven by a Westinghouse 350-hp. synchronous motor. Chips from both chippers are conveyed to a hopper which feeds the three Sumner shaker screens. Oversize chips are reduced in a hammermill type rechipper and rescreened. Fines from the screens are transferred to the semi-chemical chip system.

Accepted chips drop onto an inclined belt conveyor and are taken to the three 64,000 c.f. steel storage silos. Silos are equipped with Link-Belt rotary plate beaters which discharge the chips to belt conveyors which take the chips direct to the digesters.

Wood mill equipment supplied by Sumner Iron Works includes the two chippers, hydraulic barker, chip screens, chip feeders, motor driven drag saw, 96-inch diameter cut-off saw, band mill, log carriage, and other log-handling and saw mill equipment. Filing room equipment includes a Hanchett knife grinder and circular saw sharpener. Band saws are sharpened on Armstrong Mfg. Co. tools, including an automatic band saw sharpener, band saw stretcher roll, swage and shaper.

Compressed air for the air-operated saw mill equipment is supplied by Ingersoll Rand compressors. The wood mill is equipped with an Ederer pendant operated crane for use in handling equipment and also for use as a canting crane.

The bulk of the wood and chip conveying equipment was supplied by Link-Belt, including 12 chain conveyors and chain feeders, six rotary plate feeders (on chip silos), two chip washer units complete, and nine belt conveyors. All rubber belts were supplied by the B. F. Goodrich Co. Nearly 8,500 feet of rubber conveyor belting was required. Individual belts ranged from 16 to 60 inches wide and from 90 to 3,922 ft. long. All belts were vulcanized endless on the pulleys. Chip storage silos were built by Consolidated Western Steel Corporation, which also fabricated most of the steel tanks throughout the entire mill.

Just as the two wood preparation systems are entirely separate, the two pulp and paper systems are completely separate. However, both pulping systems use the same cooking liquor, and the same recovery plant handles the black liquor from both processes.

Liquor making

White liquor is made by the conventional continuous recausticizing system utilizing Dorr equipment. Raw green liquor from the smelt dissolver is clarified before being pumped to the slaker, where both recovered and makeup lime are added. This milk of lime slurry passes to the 3-stage causticizer where the recausticization is completed. Raw white liquor is then clarified and pumped to storage.

Lime mud from the white liquor clarifier is washed in a tray thickener and is pumped to either of two agitator storage tanks. Dorr equipment comprises four tray thickeners, for green and white liquor clarification and for lime mud and dregs washing, three causticizing tanks, and two slurry mixers for lime mud storage. Worthington pumps are employed in the liquor system for handling green liquor, white liquor, milk of lime and lime mud.

Included in the causticizing department are the slaker and an agitated storage tank for preparing milk of lime used in bleaching operations.

Lime mud is given a final wash on a Swenson rotary vacuum filter that discharges through a water-cooled screw conveyor to a 7 x 8 x 250-ft. long Allis-Chalmers rotary kiln where the mud is calcined for re-use. The two-diameter kiln with a 60-ft. enlarged section at the firing end contains a chain section at the feed end to aid heat transfer. The kiln is driven by an Allis-Chalmers 40-hp. four-speed motor with a V-belt drive. An auxiliary gasoline engine drive arrangement is installed to prevent warping of the kiln due to uneven cooling should power failure cause a kiln shutdown. The kiln is fired with a Coen Eng. Co. combination oil and natural gas burner. An a-c master control panel mounts the various pushbutton operating stations and instruments for controlling the operation.

Hot lime is transferred from the kiln to the storage bin by a Link-Belt conveyor system consisting of a horizontal drag conveyor with a water-jacketed trough and a centrifugal discharge elevator.

New chemicals, such as lime, soda ash, and salt cake, are received in railroad cars and are unloaded and transferred to storage by means of Fuller Airveyor pneumatic conveyor systems.

Chemical recovery

Weak black liquor from the brown stock washers of both standard kraft and semichemical pulping systems is pumped to storage and then to the Goslin-Birmingham six body, six effect, long tube evaporator equipped with La Bour transfer pumps. The evaporators are built outdoors and completely unhoused. Operations are controlled by Brown instruments. After it is concentrated heavy black liquor from the evaporators goes to intermediate storage and then is pumped to the cyclonic evaporator of the Babcock & Wilcox recovery furnace. Here, flue gas from the furnace further evaporates water from the black liquor which is sprayed into the chamber. Flue gas temperatures are thus lowered from about 450 F. to 300 F. before going to the Cottrell precipitator.

Concentrated black liquor from the cyclone evaporator is pumped to the salt cake mixing tank where salt cake is metered into the liquor with a Merrick Feedoweight unit. Black liquor containing recovered chemicals from the precipitator is also mixed in at this point. The liquor is then pumped to the spray nozzles of the recovery furnace, where, after burning, molten chemicals from the furnace flow into a tank where they are

Black-Clawson cylinder board machine has three calenders, reel, in-line duplex cutter, layboy, and rewinder

B-C cylinder wet end with six Uniflow vats and Hydronamic inlets; Miami Selectifier screens are on back side

dissolved in weak wash liquor from the causticizing department to form raw green liquor.

The Babcock & Wilcox Tomlinson recovery furnace is designed to burn black liquor equivalent to 225 tons of pulp per day and to produce about 100,000 lb. of steam per hour at 700 F. and 600 psi operating pressure. The unit is equipped with a superheater, economizer, tubular air heater and has a completely automatic Diamond soot blowing system that virtually eliminates the need to hand lance the tubes.

Chemical dust still remaining in the flue gas leaving the cyclone evaporator is removed in the vertical-flow type Cottrell precipitator, designed and installed by Research Corp. This unit has a rated capacity of 108,000 cfm and recovers about 175 lb. of chemicals per ton of pulp produced. Dust is mixed with black liquor and pumped into the salt cake mixing tank. Black liquor pumps used in connection with the recovery furnace were supplied by Worthington Pump and Machinery Corp.

Sulphate pulping

The kraft pulp mill is designed to produce 150 tons per day in three 3800 cf capacity A. O. Smith stainless steel clad digesters. These are equipped with Esco (Electric Steel Foundry Co.) circulating and indirect heating systems, each of which consists principally of a stainless steel strainer, tubular heat exchanger and Bingham circulating pumps of all stainless steel construction.

Digesters are charged with chips from the belt conveyor by means of a Link-Belt automatic tripper. Control of the digester charging operations and of the Yarway motor operated blow valves, is handled from a push-button station on the operating floor. All three digesters are blown to a common blow tank.

Heat is recovered from the blow steam in a Foster-Wheeler recovery system, consisting of an atmospheric condenser of the direct contact type for condensing blow steam, a 2-stage flash heater with stainless steel tubes for heating fresh water with dirty hot water, a vacuum unit made up of a single-stage air ejector and after condenser. This equipment is designed to heat about 700 gpm of fresh water from 70F. to 150 F.

One of the unique features of the pulp mill is the installation of a Link-Belt Man-lift elevator. This saves time for the operators, who may thus travel between different floor levels with ease. This eliminates the need for climbing stairs and waiting for the conventional type elevator.

Washing and screening

Brown stock from the blow tank is pumped through a De Zurik pressure type consistency regulator to the Impco vibrating knot screens just ahead of the washers. Knots and other over-size material rejected by the screens are returned to the semichemical process.

Stock accepted by the de-knotter screens is washed in a 4-stage countercurrent Impco brown stock washing system, consisting of four rotary vacuum washing units and re-pulpers with G-E variable speed drives and equipped with a J. O. Ross hood and exhaust system. The hood, 17½ feet wide by about 72 feet long, covers the vibrating screens, as well as the four washing units. Filtrate tanks for each washer stage are piped to a foam tower with an Impco centrifugal foam breaker.

After washing, brown stock is pumped from the dump chest to a battery of Impco flat screens. Screen plates, supplied by Magnus Metal Corp., are made from thin stainless steel sheets and are designed for maximum flow. Screen rejects are passed through a Rietz disintegrator and sent to an unbleached pulp chest. Accepted stock is thickened on two Impco deckers. The bulk of the stock is bleached, but a portion of the unbleached stock is lapped on an Impco wet machine.

Bleaching

Washed screened stock is bleached in five stages: low density chlorination, high density caustic extraction, low density caustic soak, and 2 stages of hypochlorite bleaching. Major equipment is as follows: Impco stock meter, De Zurik consistency regulator, four Impco washers with G. E. variable speed drives, five Impco mixers for the bleaching towers.

Reaction towers, stock chests, head boxes, washer vats, etc., were constructed with corrosion resistant linings by Stebbins Engineering Corp. The chlorination tower has an acid proof lining, while the caustic reaction and hypochlorite towers are alkaline resistant. Allis-Chalmers stock pumps and high density feeders are employed. Instrumentation of bleaching operations is handled for the most part by Brown instruments. Fischer & Porter rotameter recording controllers are used for chlorine, caustic and hypochlorite.

After bleaching, the stock is pumped to an open type De Zurik consistency regulator, and then is given a refining treatment by a battery of four, 42 inch Sutherland refiners, each driven by 300 hp., 450 rpm Westinghouse synchronous motors. Refined bleached pulp then goes to the paper machine chest.

Semichemical pulping

Three continuous Chemipulpers, supplied by Paper & Industrial Appliances, Inc., are employed to cook the semichemical pulp for 9 pt. corrugating medium. Each of these units is made up of a screw feeder, four B-K reaction chambers (20% stainless steel clad) followed by an American Defibrator Co. Asplund defibrator driven by a 250 hp. Westinghouse synchronous motor.

Milton Roy duplex pumps continuously inject white liquor into the chip feed unit and 150 psi steam is injected at the same point. Each unit is arranged with a long down pipe to accommodate additional reaction chambers when desired.

Production capacity of each Chemipulper is about 40 tons per day. Retention time in the unit is about 12 minutes, but this may be varied by changing the sprocket on the drive motor of the reaction chamber screws.

After being cooked and defibrated, the hot brown stock is blown to a cyclone receiver and then to a dump chest before being given a single pass through the two parallel Sutherland 42-inch refiners with stainless steel discs. The stock is then washed on the Impco 2-stage brown stock washing system. Filtrate from the brown stock washers is concentrated and chemicals recovered along with the liquor from the standard kraft process.

Washed semichemical pulp is pumped through a De Zurik open type consistency regulator and to a battery of three more Sutherland refiners, before going to the paper machine chest. Each of the five Sutherland refiners on semichemical pulp are powered by 250 hp., 450 rpm Westinghouse synchonous motors.

Stock chests throughout the mill are equipped with Impco agitators. Most of the stock pumps in the pulp mill were furnished by Allis-Chalmers.

Cylinder board machine

Food container board is made from bleached sulphate pulp on a Black-Clawson six-cylinder board machine designed for speeds up to 500 rpm. The wet end of the machine is 136 inches wide, and the sheet from the dryers trims 122 inches. It employes two suction presses and four plain presses. Three sections of dryers are followed by three calender stacks, reel, in-line slitter and cutter, and rewinder.

Bleached stock from the Shartle stainless steel machine headbox passes through six Miami Selectifier screens before going to each of the vats. These compact vertical rotary screen units operate under pressure and are wholly enclosed. Rosin size is prepared with a Hercules automatic emulsification system.

Each of the six Uniflow type stainless steel vats it equipped with Hydronamic inlets and individual Shartle class A centrifugal circulation pumps. Each vat is equipped with automatic level control. The six cylinder molds, furnished by Cheney Bigelow, are 48 inches in diameter, and the rubber covered couch rolls are 21 inches in diameter.

Water is extracted from the formed sheet by both suction and plain presses. From the last mold, the sheet carried by the bottom felt passes through a suction drum press, two plain primary presses, first main press (plain), second main reversing press (suction), and third main press (plain). The 30-inch diameter suction drum roll is brass with an 18-inch rubber-covered top roll. Both primary presses have 20-inch diameter rubber covered top and bottom rolls, and the three main presses have 34-inch diameter rubber-covered bottom rolls and Stonite top rolls of the same diameter. This includes the second main reversing press, which is a rubber-covered suction roll. The suction drum and reversing press suction roll were built by Beloit.

All told, four wet felts are employed: bottom felt, top felt, second main press and third main press felts. Gilbert and Nash felt guides are used. The bottom felt is cleaned with a fresh water shower, followed by a whipper and a Downingtown felt suction roll. The top felt employs a whipper and suction box while the two main press felts are cleaned with Vickery felt conditioners. Four Nash pumps supply the vacuum for the suction rolls and felt conditioners. All press rolls are weighted pneumatically and regulated by Foxboro pressure control.

Sixty-two paper dryers and five felt dryers are divided into three sections. Top canvas is used on all three sections. Dryers are equipped with a J. O. Ross hood and exhaust system and a Ross-Grewin system. A Midwest Fulton drainage and vapor circulation system handles the condensate from the dryers and a Bowser pressure type recirculating system provides lubrication for the plain dryer bearings and the anti-friction felt roll and calender bearings. A Brown Moistograph aids the control of moisture in the sheet.

From the dryers, the sheet passes through three Black-Clawson calender stacks with Farrel-Birmingham rolls. The first calender stack contains five rolls, and the other two contain seven rolls each. The rolls are equipped with Vickery doctors.

After calendering, the board may be wound into jumbo rolls on a Black-Clawson Pope type reel, or it may by-pass the reel and go direct to the Cameron slitter and the B-C duplex cutter. Here the board is cut into sheets, which are piled on pallets and packaged for shipment.

If the board is wound up on the reel, it is rewound on a Langston Model D A slitter and rewinder. This machine, capable of rewinding rolls up to 60 inches in diameter, is driven by a G-E variable speed drive with regenerative braking incorporated in the unwinding stand unit.

The paper machine is driven by a General Electric sectional electric drive. Each section of the paper machine has an individual drive, consisting of a motor with its own electronic amplidyne controlled supply generator. A master control panel provides stepless speed adjustment throughout the range of the machine and the speed of each section is automatically maintained. A helper drive on the wet end utilizes motors on each of the cylinder molds and primary presses.

Fourdrinier board machine

Nine point corrugating medium is made from semichemical pulp on a Pusey and Jones adjustable pitch fourdrinier. The 156-inch wire is 100 ft. long with a shake unit, seven suction boxes, a 36-inch Beloit suction couch, and a rubber-covered lump breaker roll. Stock from the fan pump goes direct to the Flow Spreader inlet and 8-ft. head adjustable slice. The inlet, slice and headbox are lined with neoprene. All rolls on the machine run in antifriction bearings. Lodding doctors are installed in the breast roll and wire rolls.

Water is extracted from the sheet in the close coupled Simplex press section, which embodies two main presses with 28-inch rubber-covered rolls. Suction rolls were built by Beloit. The presses are pneumatically loaded and regulated with Mason-Neilan controls. Both press felts are equipped with Vickery felt conditioners. Six Nash pumps supply the vacuum for suction boxes, couch, presses and felt conditioners. Gilbert & Nash guides are used for the fourdrinier wire and the felts and dryer canvas.

Forty paper dryers and eight felt dryers, all 60 inches in diameter, comprise the two dryer sections. Both sections are equipped with top and bottom dryer canvas. Drive gears are completely enclosed. A Midwest Fulton drainage and vapor circulation system handles the condensation from the dryers. A Bowser system provides lubrication for the antifriction dryer bearings, with an individual system for lubricating the calender stack bearings. J. O. Ross built the hood and exhaust system and supplied a Ross-Grewin system.

Following the dryers, the sheet enters the seven-roll pneumatically-loaded calender stack, before being reeled up on a Pope type reel. These are rewound on a Pusey and Jones rewinder with a hydraulic operated roll unloading mechanism. The winder is powered by a G-E individual drive, which also utilizes regenerative braking on the unwind unit.

The paper machine is equipped with a G-E multiple generator type sectional electric drive similar to that on the Black-Clawson machine. Each section is powered by a motor with its own amplidyne unit. A master control panel controls the draws between sections.

Finished board from both machines is handled by Yale & Towne trucks. Both gasoline and electric fork trucks were supplied by the company along with several lift type platform trucks.

Acknowledgment is made to Fibreboard Products, Inc., who through A. McKie Donnan of Brisacher Wheeler Staff, San Francisco, authorized publication of this article and supplied pictures. The help and co-operation of the major equipment suppliers is also appreciated.

Centrifugal pumps...

stuffing boxes & packing perform vital function

Part 7 of a series dealing with centrifugal pump design, operation and maintenance.

Graphited asbestos packing (Fig. 6)
(Courtesy John Crane Packing Co.)

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Application Engineers
Worthington Pump & Machinery Corporation

▶▶▶ ONE OF THE MOST important elements in any centrifugal pump is the stuffing box, as a very slight defect in its arrangement or condition can affect pump operation to a various serious degree.

While all stuffing boxes, regardless of service, have one main function, that of packing the shaft against leakage where it passes out through the pump casing, there are several variations of this function and of the manner in which it is performed. Thus, the function of the stuffing box is to prevent leakage of air into the pump when the pressure at the interior end of the stuffing box is below atmospheric pressure. When the pressure at the interior end of the box is above atmospheric pressure, the function is to prevent leakage of the liquid out of the pump.

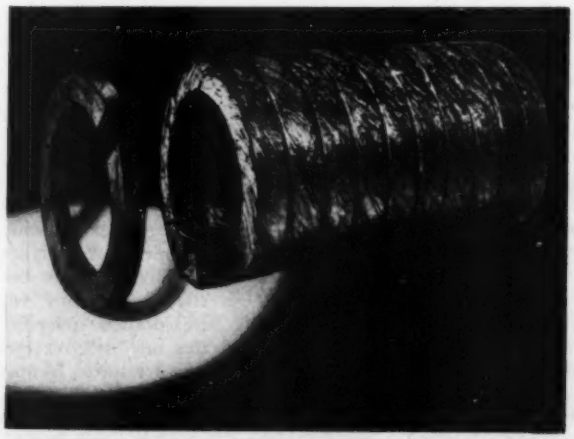
Some stuffing boxes are fitted with a stuffing box throat bushing which is a removable piece forming the bottom of the stuffing box. This bushing is always solid rather than split, even though the casing in which it is fitted may be split axially. It is generally held from rotation by a locked tongue-and-groove joint in the lower half of the casing (Figure 3).

The use of stuffing box throat bushings is based mainly on manufacturing problems rather than on any particular advantage in operation. They are generally applied to pumps of small size, when the diameter of an integrally formed stuffing box throat would limit the size of the boring bar used to machine the casing to an impractically small diameter. They are also used on pumps when the bottom of the stuffing box is subject to severe wear because of abrasive pumping conditions. The bushing then can be replaced when necessary, to restore original clearances.

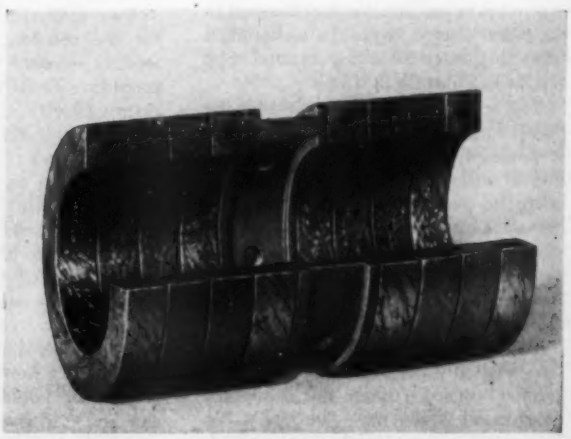
Seal cages

In order to provide against air leakage into the pump when operating on a suction lift or under a vacuum, a water seal cage or lantern ring is fitted into the stuffing box, as in Figure 1. For ease of assembly, seal cages are generally split axially. Water or sealing fluid under pressure is piped to the chamber formed by this seal cage and makes an effective seal beyond which air cannot pass into the pump. This seal chamber also provides a reservoir of water or fluid for cooling and lubricating the packing rings. A seal also may be used to prevent the outflow of the pumped liquid into the atmosphere when this liquid is inflammable or chemically active and dangerous.

Certain installations involve variable suction conditions, where the



Metallic packing, ring and spiral form (Fig. 7)
(Courtesy John Crane Packing Co.)



Combination of hard and soft packing (Fig. 8)
(Courtesy John Crane Packing Co.)

pump operates part of the time with head on suction and part of the time with a suction lift. It will be observed that when conditions are such that the pressure inside the pump is above atmospheric, the function of the water seal cage is inoperative (except for lubrication) when the pump is in operation. However, it is still provided so that when priming the pump at starting, all the air can be excluded and the priming can be accomplished.

When the pump is handling clean cool water, stuffing box seals are usually connected to the pump discharge or, in the case of multistage pumps, to an intermediate stage. An independent water sealing supply should be provided under the following conditions:

(a) When the suction lift exceeds 15 ft.

(b) When the discharge pressure is less than about 10 lb. or 23 ft. head

(c) When pump is handling hot water over 250 F. where adequate cooling is not otherwise provided (Except in boiler feed service)

(d) When the water is muddy, sandy or gritty

(e) On all hotwell pumps

(f) In general, when the liquid handled is other than water, such as acid, juice, molasses or sticky liquids, and no special provision is made in the design of the stuffing box for the liquid handled

In some pumps, the connections to the seal cage are arranged so that the sealing liquid can be introduced into the packing space through either an internal drilled passage from the pump casing or from an external source, using either clear water or some other sealing fluid. Figure 3 illustrates the use of such connections. In Figure 3-A, which is the general service arrangement where the pumped liquid is used for sealing, the external connection is plugged. If an external source of sealing water is required, it is connected to the external pipe tap and a socket head pipe plug inserted at the internal pipe tap, as in Figure 3-B.

The seal cage should be close to the pump interior when an abrasive liquid is handled, so that the clear sealing liquid will flow into the pump and keep the packing free from abrasives. Where a minimum of dilution is desired, the seal cage should be located away from the pump interior. The recommended location of the seal cage is illustrated in Figure 4.

For intermittent service and other duties when water or other clear liquids cannot be used (or are not available) a grease seal may be effective. Weighted grease sealers are available and are frequently used with chemical pumps to avoid dilution. This type of seal is also frequently used on low head drainage pumps operating with a suction lift and often with a discharge pressure below atmospheric because of a syphon system. Grease seals also are used frequently on pumps handling sewage.

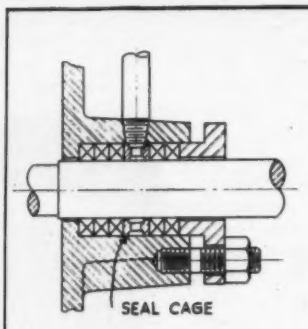


FIG 1 – CONVENTIONAL STUFFING BOX WITH WATER SEAL CAGE.

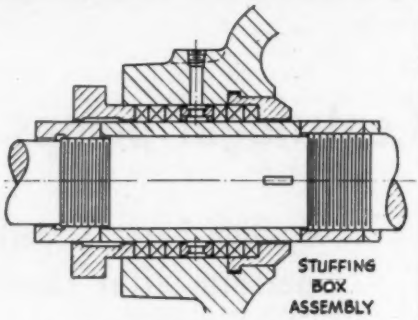


FIG 2 – STUFFING BOX WITH A THROAT BUSHING.

Water-cooled stuffing boxes

The problem of maintaining the packing in a stuffing box is made more difficult with high temperatures or high pressures. In order to reduce the temperature of the liquid reaching the packing, and to lower the temperature around the packing, pumps handling hot liquids or having stuffing boxes subjected to high pressures are provided with water jacketed stuffing boxes to which cooling water is supplied. This cooling water removes the heat from the liquid leaking through the stuffing box as well as the heat generated by friction in the stuffing box, thus improving the conditions under which the packing has to operate. (In some special cases, oil or gasoline may be used in the cooling jackets instead of water.)

Two different methods are available for the construction of water cooled stuffing boxes. The first consists of providing cored passages in the casing casting itself. These passages, which surround the stuffing box, are arranged with in and out connections. The second uses a separate cooling chamber combined with the stuffing box proper, the whole assembly being inserted into and bolted to the pump casing. The choice between the two is made principally on the basis of individual manufacturing preferences.

Of course, the limiting pressure and temperature conditions against which it may be possible to pack a stuffing box vary with the type of pump in question, as it may not be economical to equip a pump which is normally intended for moderate service conditions with an expensive type of stuffing box for the infrequent application when such a construction would be needed. Therefore, whenever the limitations imposed by the manufacturer on the stuffing box conditions for a given pump are exceeded, the only solution resides in the application of pressure reducing devices ahead of the stuffing box proper. Since the design of such devices has now reached a high degree of proficiency, the only drawback to their application is the necessity of bleeding a part of the effective capacity of the pump back to a lower pressure level and the resultant reduction in the efficiency of the installation.

Pressure reducing devices

Essentially, these devices consist of a bushing or a meshing labyrinth located between the pump interior and the stuffing box proper and ending in a relief chamber. The latter is connected to some point in the installation where a suitably low pressure is established and the leakage past the pressure reducing device is returned to this point. When the liquid pumped must be salvaged, as for instance in the case of treated feedwater, it is returned back into the pumping cycle by some other pump in the cycle. If, on the other hand, the liquid can be wasted, the relief chamber may be most conveniently connected to a drain.

There exists a great number of different designs of these pressure reducing devices. Each solution is usually the product of an individual designer and may involve highly ingenious but still rather precise mechanisms for accomplishing the desired purpose. Figure 5 illustrates one such device, suitable for limited pressures. In this particular case, a short serrated stuffing box bushing is inserted at the bottom of the stuffing box and is followed by a water seal cage which fulfills the

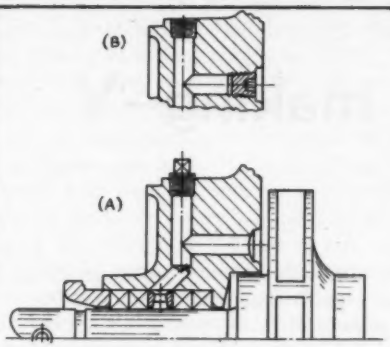


FIG. 3 — ARRANGEMENTS OF SEALING CONNECTIONS. (A) INTERNAL SEAL (B) INDEPENDENT SEAL

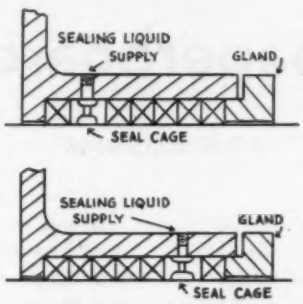


FIG. 4. — RECOMMENDED LOCATIONS OF SEAL CAGE

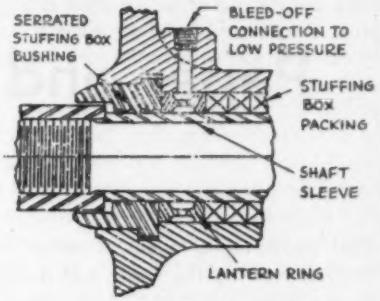


FIG. 5 — PRESSURE REDUCING STUFFING BOX BUSHING USED FOR MODERATELY HIGH STUFFING BOX PRESSURE.

function of the relief chamber. The leakage past the serrated bushing is bled off through a connection to a low pressure point.

When relatively high pressures on stuffing boxes are encountered, labyrinths of the intermeshing type may be located ahead of the stuffing box. They may likewise be located on the discharge side, where they follow the balancing device and precede the stuffing box. It should be noted that the piping from the leakoff chamber following such pressure reducing devices should be amply sized so that, as wear takes place and leakage increases, there will not be an appreciable increase of friction in the leakoff piping and a subsequent increase of the pressure at the stuffing box.

Stuffing box packing

There are numerous types and materials of stuffing box packing, each especially adapted to some particular class of service. Some of the principal types are discussed below:

(1) Graphited asbestos packing is comparatively soft and is suitable for cold water and hot water applications in the lower temperature range. This packing is generally supplied in continuous coils of square cross-section and in various sizes. To be ready for use, it is cut off from the coil in lengths to make individual rings, as shown in Figure 6. The ends are cut at a slight angle with a slight clearance to provide for expansion so as to prevent "buckling." This packing is good for general service under normal pressures and is the most commonly used. For pressures beyond 200 psi, this packing is not suitable, except at very moderate rubbing speeds.

(2) Metallic packing rings are composed of flexible metallic foil with graphite lubricant and squared to the proper size. (Figure 7.) This packing is self-lubricating for its starting-up period, as the foil is impregnated with oil and graphite under compression, permitting the oil to flow to the surface of the moving shaft or sleeve. The foils are made of various kinds of materials such as babbitt, aluminum, copper, etc. Babbitt foil is used for low and medium temperatures on water and oils (up to 450 F.) and medium to high pressures. Copper is used for medium to high temperatures and pressures on water and low sulphur content oils. Aluminum is mainly used on oil service, also for medium to high pressures and temperatures.

Standard practice is to obtain this packing in ring rather than coil form, die-molded to exact size. For best results, the shafts or hardened sleeves, which are preferred, should be in perfect alignment and concentric with the axis of rotation, should operate without vibration and should be highly polished. The choice of the material of the shaft or shaft sleeves is extremely important to the life and maintenance of metallic packing. Some packing sets are often made in combinations of hard and soft rings, giving very good results. The irregular pattern of such a combination is shown in Figure 8.

Many other types of packing are commonly furnished to meet customers' special specifications, such as hemp, cord, braided type, duck fabric, chevron type, and others too numerous to mention.

Stuffing box glands

Stuffing box glands may assume several forms, but basically they can be classified into two groups:

(a) Solid glands
(b) Split glands

Split glands are made in halves so that they may be removed from the shaft without dismantling the pump to provide more working space when the stuffing boxes are being repacked. They are desirable on pumps that have to be repacked frequently especially if the space between the box and the bearing is too restricted. The halves of split glands are generally held together by bolts, although other designs are also used. Split glands are generally a refinement of construction, not a necessity, and are rarely used in the smaller sizes of pumps. They are quite commonly furnished for large size single-stage pumps, for some multistage pumps and for refinery pumps.

Another refinement often used, consists of the use of swing bolts in connection with stuffing box glands, to permit swinging the bolts to the side out of the way when it becomes necessary to repack the stuffing box.

In a great many applications, the stuffing box leakage, if permitted to issue unimpeded into the atmosphere, could give rise to serious inconveniences, if not actually danger to the operating personnel. This is frequently the case with centrifugal pumps handling liquids such as hydrocarbons at temperatures above their flash point, or vaporizing temperatures. As this leakage cannot, in some cases, be cooled sufficiently by the application of a water cooled stuffing box, smothering glands are used. In such a gland provision is made in the gland itself to introduce a liquid, either water or another hydrocarbon at low temperature, which mixes intimately with the leakage, lowering its temperature or, in the case of volatile liquids, absorbing this leakage.

Stuffing box glands are generally made of bronze, although cast iron or steel may be used for all iron fitted pumps. Where used for refinery service when the fluid pumped may give off inflammable vapors which may ignite from sparks generated between the gland and the shaft or sleeve if both are made of ferrous metal, iron or steel glands are generally bushed with a nonsparking material, such as bronze.

Paper and paperboard making—V

HARRY WILLIAMSON

That papermaking is an art rather than a science is evidenced by the many and divergent opinions on the "how" and "why" of cylinder machine formation. By outlining the principles involved and by describing the practical methods for achieving desired effects, the author hopes to dispel some of the mystery surrounding this rather common piece of papermaking equipment.

Function of the Multiple Cylinder Machine

THE PURPOSE OF the modern cylinder type paperboard machine is to form a sheet of paperboard much thicker in total caliper than could be formed on the single wire mesh of the fourdrinier type machine. The total caliper obtainable is variable in relation to the density or weight per point of caliper required; the greater the density or weight per point of caliper, the lower the total caliper it is possible to make on the same number of molds. For example: A 0.050 point sheet weighing 7 lb. per point would have a ream weight of 350 lb. per 3000 sq. ft. If the density of the formation were to be increased to a ream weight of 500 lb. per 3000 sq. ft., we would have a formation weight equal to 10 lb. per point of caliper. The limiting factors to the total caliper obtainable on any given cylinder type machine are:

(1) The number of molds or total square feet of formation area available

(2) The DENSITY per point of caliper required in the finished board

(3) The operating speed necessary to run to obtain the required production of the specified caliper

REAM WEIGHT DENSITY TABLE

Ream Weight 24 x 36/500 0.001 In. Caliper (Pounds)	Percentage Volume Fiber	Air Space
15	65.81	34.19
14	61.35	38.65
13	57.04	42.96
12	51.96	48.04
11	48.26	51.74
10 (100% Mullen)	43.87	53.13
9	39.48	60.52
8	35.10	64.90
7	30.10	69.29
6	26.32	73.68
5	21.93	78.07

It will be seen that the extreme range of cylinder mold formation in *specialty* papers is from a maximum of 0.045 points of saturating or roofing felt made from rags or cotton linter waste with the very *low* density formation of 120 lb. per 3000 square feet or 2.7 lb. weight per point of caliper; made on *one* mold, to the extremely high density formation of imitation press board; a ream weight of 270 lb. or 15 lb. weight per point of caliper made on eight successive molds. With the comparison of using 48-inch diameter molds in each case the relation of formation density to formation area may be stated as: "With a sheet density of 2.7 lb. ream weight per point of caliper 45 points of caliper can be made on 11 linear feet of formation area and with a sheet density of 15 lb. ream weight per point of caliper 18 points of caliper can be made on 88 linear feet of formation area. In addition the single mold making the 45 points would have to have a much *coarser weave* of wire mesh than that on which the press board was formed." (See Table)

In operating effect the cylinder machine wet end is comprised of a series of complete paper forming machines. Each; complete in itself, consists primarily of a vat in which the cylinder mold rotates, the wire mesh covered cylinder mold on which the sheet is formed, a couch roll revolving on top of the mold to couch the formed sheet to the felt, a supply system to deliver the mixed volume of stock and water to the vat in continuous and even supply rate demand, and a circulating white water system to take the water drained through the wire mesh from the inside of the revolving cylinder mold and deliver it back to the individual supply system and to the reserve white water system.

The cylinder machine wet end can form, in individual continuous webs, as many sheets of paper as there are molds on the machine. Each sheet of paper is picked up successively by the traveling felt *by the pressure* of the revolving couch roll as the felt passes between this roll and the wire mesh which forms the face of the revolving cylinder mold and on which the paper is formed. Each revolution of the cylinder mold an endless sheet of paper is formed and couched off continuously onto the traveling felt. The LAMINATION of the succeeding sheets one to the other is *effected* by PRESSURE and WATER ALONE while still in the formation or wet end area of the machine. (Figure 1)

Auxiliary equipment

The auxiliary equipment with *each* mold section comes within the dual category of *control* of the mixed volume and keeping the revolving *wire mesh clean.* Control of the mixed volume *to* the formation area; control of the mixed volume *in* the formation area; control of the water circulating system from the *inside*

of the cylinder molds and *pressure* showers to keep the wire mesh clean after the sheet has been couched off and *before* the revolving wire mesh, on which the paper is formed, re-submerges in the mixed volume of fiber and water. Such equipment is comprised of:

(1) A mixing box which receives the mixed volume from the screen and also water from the circulating system and delivers this total mixture, usually by gravity, to the rear compartment of the vat.

(2) The receiving portion of the vat divided into compartments by vertical underflow and overflow baffle boards; the whole of this arrangement to prevent FLOCCULATION, create DISPERSION evenly across the width of the vat compartments, and, help CONTROL VELOCITY of flow to the formation area.

(3) Horizontal baffle boards, plain and perforated; revolving perforated rolls; all of which are specifically to further *insure* complete and even DISPERSION of the mixed volume across the width of the vat compartments and to help *control,* in conjunction with the vertical baffle boards, the *velocity* of flow *to* the formation area. These horizontal baffle boards are placed at suitable heights in the separate compartments of the vats; the number, position, area of slot openings or diameter of perforations arranged in accordance with the grades and production per hour of the boards to be made. The revolving perforated rolls, one to each vat, are usually placed in the *direct* line of flow immediately preceding flow contact of the mixed volume with the wing boards. The function of this roll is to *finally* disperse any flocculation of fiber bundles which may have escaped the combined dispersion action of the baffle boards. In this connection it is to be noted that the higher the consistency in conjunction with the slower speed of the machine; a condition existing when making extremely heavy boards, the greater the danger of FLOCCULATION into fiber bundles.

(4) The wing boards are the LAST UNIT of operating control of the mixed volume *before* this volume, from which the paper is formed, enters the circle, the actual formation area. Comprised of two pieces of hardwood approximately three inches wide and from ⅜ to ½ inch thick, planed and sandpapered SMOOTH, these wing boards are fitted, with the edge uppermost, to the upper edge of the last vertical baffle board over which the mixed volume flows *immediately* before entering the formation circle. Fastened by a lag bolt at the center, each wing board may be moved up or down at the *outside* end, the back and front side of the vat respectively. A thread bolt, fastened vertically to the upper edge of the outside end of each wing board, passes through a fixed bracket on the vat wall. Operation of a wing nut on the thread of this bolt against the fixed bracket actuates the movement of the wing board up or down. The wing boards can thus be adjusted to form an inverted V from the center to the outside edge of either wing board may be adjusted separately to form an angle of resistance against the horizontal flow of the mixed volume into the forming circle. By this means the LEVEL of the forming sheet ACROSS the width of the mold is controlled.

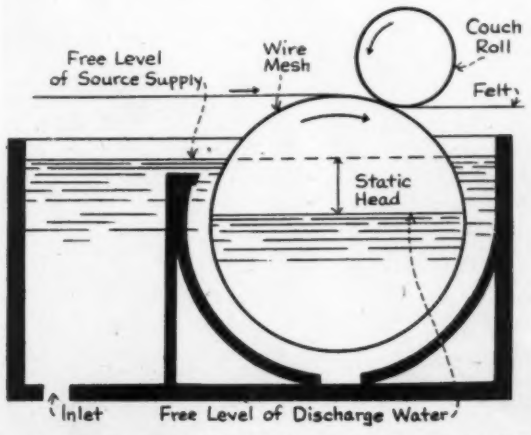


Fig. 1—Counter flow vat. Differential in water levels or "status head" equals 0.036 lb. pressure per sq. in. of the submerged area per one inch differential

5) The actual formation area, commonly called THE CIRCLE is an arrangement of a circular compartment in which the cylinder mold revolves. Instead of a rectangular compartment in which flocculation of fibers into bundles and actual settling of the floc in corners formed by the rectangles could take place; this circular arrangement is designed to not only prevent such reflocculation but also to *maintain* a THOROUGH DISPERSION of the individual fibers throughout the liquid volume until formation of the sheet is affected.

While the arrangement is circular it is *never* a TRUE CIRCLE. The shape generally follows the circle of the revolving mold, but, the distance from the surface of the revolving mold is varied at the inlet, outlet if any, and the bottom of the mold in accordance with the grades to be made and the ideas of the operators as found by experience on the particular grades run.

As the purpose of this circle is to *maintain dispersion* and *prevent flocculation,* it is at once obvious that on a wide range of ream weights made and a wide range of ream weight *densities required,* any ONE FIXED DISTANCE of this circle from the revolving face of the mold *cannot* be *equally* effective on the various differences of the mold *cannot* be *equally* effective on the various differences of VOLUME and VELOCITY of volume encountered while making these widely different weights and qualities.

There is very great divergence of opinion as to the operating distance or point of departure from the true circle of this circular compartment which holds the supply of mixed volume from which the sheet of paper is *directly* made. In each mill a suitable compromise is arrived at which will be most generally efficient on *all* the grades made in that particular mill. Even then there will be one or two grades on which either production per hour or quality of formation will have to be partially sacfificed. It is obvious that a circle arrangement 100 per cent efficient in the manufacture of say 0.016 point board from virgin kraft fiber, could not possibly be *equally* efficient in the manufacture of 0.040 chipboard made from mixed waste papers, corrugated waste, and news. The volumes and *velocity* of volume used in each instance are so widely apart.

At the moment it is sufficient that the reader understand the operating PRINCIPLE OF THE CIRCLE; the

various arrangements for a variety of grades will be described in detail in a later chapter dealing with the operation of the cylinder machine.

Various designs of vats and circles have been evolved by operators and paper machinery builders in an effort to make an equally efficient ALL PURPOSE CYLINDER MOLD VAT UNIT. The most modern of these entirely eliminate the baffled compartments as described above. In each instance some form of fully circulating system with constant OVERFLOW OF VOLUME and SLICE control of VELOCITY is arranged for. *Both* of these very important factors are adjustable to requirements; the one by pumped supply and overflow for volume and the other by adjustment of slice to control velocity. These modern designs are a mechanical refinement of the *same desired objective* eg. a thorough and *continuously even* distribution and dispersion of the individual fibers throughout the liquid mass delivered at the point of, and during the act of *continuous formation,* at a volume velocity suitable to effective uniform formation of the required quality at the desired speed. Such is the *objective* whether the design of the operating unit be old fashioned or modern. Such is the PRINCIPLE OF FORMATION on *any* paper machine. Now that we have an understanding of the wet end; the formation area, of the cylinder machine we will discuss formation of paper on the cylinder type unit.

Cylinder mold formation

The subject of cylinder machine formation is just about as controversial in the machine room half of the paper making world as the subject of hydration or stock preparation is in the beater room half. Perhaps this is because there are no published books dealing specifically with the actual operation and running of the cylinder type board machine. Descriptions of vats and cylinder molds appear in the trade publications regularly but so far, neither technically trained nor practical operator has ventured upon the turbulent sea of authorship with written contribution of specific statement of the formation of paper on the cylinder mold. Individual papers have been read at conventions and afterward published dealing *generally* with the operation of the cylinder machine. The methods of handling waste papers and various raw materials in the manufacture of paperboard have been more prolifically written about. The use of suction rolls and suction presses, stack dryers and three deck dryers have all been written about but NOT FORMATION. As far as published matter making *definite statements of fact,* relating actual experience, recording of accepted practice and opinions in the actual operation of the cylinder board machine as a reference and a guide to use; the operator of a cylinder board machine is the most neglected man in the paper industry.

The author makes no excuses for himself. Repeatedly letters have been received asking for a similar practical series on board machine operation to serve the same practical purpose that *Lessons in Paper Making* Parts I and II served in the operation of the fourdrinier machine. Since 1932, the author has enjoyed positions of executive authority in some of the largest operators of the board industry and also some of the manufacturers of the HIGHEST GRADES of boards and specialty boards. The companies were fully staffed with technicians, engineers, and control by test station. Machinery, trained men, and full authority over mill operations gave this writer a unique opportunity to really find out just what does happen in the practical operation of a board machine. Vats galore have been rebuilt again and again and the *results* in actual operation checked and noted. The conclusions drawn from these years of experience are now passed on to the reader in the form of statements of fact, well considered opinion, and actual practical experience.

Exhibited at Superintendents Convention . . .

Portable Carthage chipper driven by a power take-off from truck motor. Handles logs up to 6 inches diameter, also long branches, by means of a horizontal chain feed. Wood enters at 30-degree angle to the disk. Produces chips with less bruising, less sawdust, and less power. (Pix taken in parking lot immediately south of the Edgewater Beach Hotel during 31st annual convention of the Superintendents Association.)

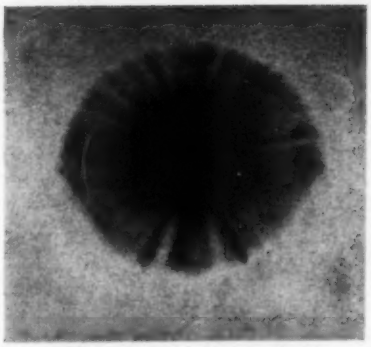


Fig. 2—Chromatogram of spruce, butyl acetate solvent

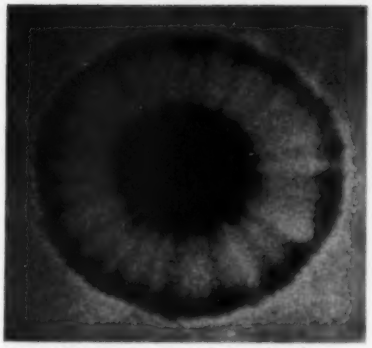


Fig. 3—Chromatogram of pine, butyl acetate solvent

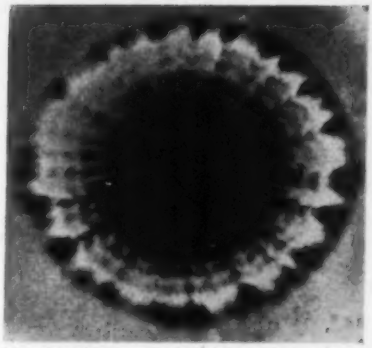


Fig. 4—Chromatogram of fir, methanol solvent. Compare with Figure 1

Chromatographic behavior of lignins

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▶▶▶ THE PRACTICE OF comparing the analytical results of experiments upon the lignins of diverse genera of plants, apparently without much concern for the possibility of the chemical non-dentity of the lignins involved, has been common. The means of comparing such lignin preparations in the past have ranged from the impossible to the exceedingly difficult and tedious, usually yielding obscure and often contradictory results. Recent application of chromatography to lignin *(1)* has made available a new and discerning method of making such comparisons which provides definite data when non-identity exists.

Purpose of this study is to investigate the chromatographic behavior of lignins from woods of different genera, to evaluate the reliability of past comparisons of analytical data obtained from the lignins of different genera, and to determine the breadth of validity of conducting future experiments on different woods. In short, if lignin be one compound, complex, or consistent aggregate of compounds, it would be inmmensely valuable to be sure of it now. If, on the other hand, the chemical character of lignin and its isolated preparations vary from genus to genus, then the dimensions of lignin chemistry may be limited only by the number of different plants which contain it.

In any event, the results of such a study should provide some evidence that lignin is as uniform as it has sometimes been assumed to be in the past, or, that it has variations and heterogeneity which invalidate many past comparisons and which must be specifically recognized in future investigations..

Results of experiments

Lignin prepared by an identical process from woods of different botanical genera exhibited chromatographic heterogeneity without exception. The particular pattern of the chromatographic heterogeneity and the accompanying fluorescence appeared to be a specific function of the botanical source. Mixed chromatograms of the corresponding zones from two different genera showed general resolution into two zones, grading from distinct to low definition.

In a few cases the resolution of the zones was too low to permit a decision as to the presence of one or two chomatographically heterogenous materials. Mixed chromatograms of non-corresponding zones invariably showed resolution into two zones. Certain over-all similarities are evident in the chromatographic behavior of lignins from some genera; nevertheless, differences exist in the chromatographic pattern between all the genera examined.

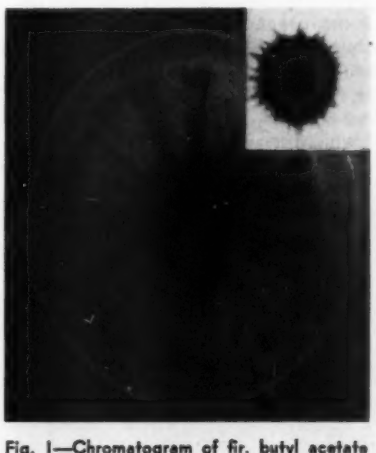

Fig. 1—Chromatogram of fir, butyl acetate solvent. Inset is central spot at higher contrast. All photographs were taken of dry chromatograms in ultraviolet light through a K2 filter. Thus the outer flourescent white ring is usually not in evidence. Compare chromatograms with the descriptive data of Table I

Chromatographic evidence suggests that lignin consists of several chromatographically heterogeneous portions, differing in fluorescence behavior and quantity. Within the limitations of the method employed and the scope of validity of the physical properties observed, the conclusion is suggested that lignin varies in chemical character with the botanical source and that inter-generic comparisons, whether past or future, are meaningless.

Evidence suggests that lignin may ultimately be found to be a multi-component complex or aggregate, the identity and quantity of individual components of which will be determined by botanical origin. The chemical treatment of a given lignin preparation will no doubt be responsible for further modification of the components. Lignin chemistry in this light seems to acquire greatly expanded dimensions and a somewhat protean character. The pattern thus suggested is in harmony with present evidence of the difficulty or impossibility of duplicating experimental results in different laboratories, on different samples, etc., and offers an explanation of the poor agreement in many reported experiments.

The above evidence suggests that the term "lignin" is generic rather than specific having a connotation similar to oil, coal, rock, wood, bird, etc. The need is suggested for lignin chemists to consider appropriate nomenclature as further evidence warrants the precise definition of specific lignin materials.

Research, like digging a hole, exposes new surface. Part of the new surface thus exposed seems to raise the question of what differences may exist in

TABLE I—Observational Data on Chromatograms

	Zone	Fir	Spruce	Pine	Aspen	Birch	Oak
UV[a] wet	I[b]	dull med br fl[a]	dull med br fl	brt tan fl	med dk br fl	med br fl	dull br fl
	II	Med red br fl	brt med br fl	med dk br fl	[c]	dk br fl	dk br fl
	III	yel fl	brt yel fl	brt yel br fl	yel fl	br yel fl	[c]
	IV	wh fl	bl wh fl	wh fl	wh fl	bl wh fl	wh fl
UV dry	I	dull dk br fl	dull dk br fl	med red br fl	dk br pur fl	dull dk br fl	dull gr br fl
	II	dk pur br fl	dk pur br fl	med dk red br fl	[c]	dk pur fl	dk pur fl
	III	lt br fl	lt br fl	brt tan fl	brt med br fl	dull tan fl	[c]
	IV	v ft wh fl	inv	inv	inv	v ft wh fl	v ft br fl
Vis wet	I	med br	med br	med yel br	br med br	brt yel br	ft yel br
	II	med br	med dk br	med dk yel br	[c]	med dk yel br	[c]
	III	inv	ft med br	brt yel br	med yel br	ft yel br	brt br
	IV	inv	inv	inv	inv	inv	inv
Vis dry	I	med br 2[d]	lt med br 2	ft br 2	med br 1	med br 2	ft br 2
	II	med br 2	med br 2	dk br 2	[c]	med br 2	med br 2
	III	ft yel br 3	ft yel br 2	brt yel br 1	yel br 2	yel br 3	[c]
	IV	inv	inv	inv	inv	inv	inv

[a] Abbreviations: bl-blue, br-brown, brt-bright, dk-dark, fl-fluorescence, ft-faint, gr-gray, inv-invisible, lt-light, med-medium, pur-purple, UV-ultraviolet, v-very, vis-visible, yel-yellow, wh-white.
[b] Zone I was the central or inner zone; IV was the outermost.
[c] Corresponding zone was absent.
[d] Estimated quantity present: 1-considerable, 2-intermediate, 3-minor.

the lignin between the species of a single genus, between heart- and sapwood, between spring- and summerwood, between compression, tension, and normal wood, and between wood from the bottom and the top of the tree where many differences are already known to exist. Only further experiment seems to hold the answer to these questions.

To read the significance of these experiments in terms of the original lignin in the wood would be immensely valuable. Reasonable conservatism limits speculation, however, to the inference that perhaps different nuclear structures are present in the parent lignin compound, complex, or aggregate. These experiments emphasize the importance of isolating the chromatographically heterogeneous portions of lignin in quantity for constitutional studies.

Experimental materials and methods

Lignin preparations isolated from the woods of three angiosperms and three gymnosperms were selected for investigation. The angiosperms were aspen *(Populus tremuloides,* Mich.), birch *(Betula papyrifera,* Marsh), and white oak *(Quercus alba,* Linn.); the gymnosperms were balsam fir *(Abies balsamea,* Mill.), white spruce *(Picea glauca,* Voss.), and jack pine *(Pinus banksiana,* Lam.).

Wood samples were mixtures of heart- and sapwood ground in a Wiley mill. Lignin was extracted by digestion in equal volumes of *n*-butanol and water at 160 C. for one hour. The resulting liquor was filtered and the lignin precipitated by dilute hydrochloric acid. The precipitated lignin was filtered, washed thoroughly with distilled water, and air-dried. The amounts of lignin, based on the original lignin, represented in the isolated samples were: aspen 87 per cent, birch 92 per cent, oak 90 per cent, fir 45 per cent, spruce 58 per cent, and pine 60 per cent. All of the lignin present in the wood was thus not represented.

Chromatography was carried out by placing an 18 cm. square of Whatman No. 1 filter paper between 20 cm. watch glasses and applying butyl acetate to the center dropwise until capillarity had carried the liquid to the outer portion of the paper. A drop of 4 per cent solution of lignin in 1,4-dioxane was then applied slowly with a capillary to the center of the paper. As soon as this was absorbed, butyl acetate was applied slowly with a dropper to a cotton ball in the center of this spot and application continued while capillarity carried the lignin outward.

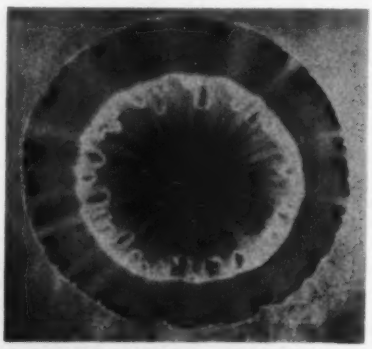

Fig. 5—Chromatogram of pine, double development with butyl acetate

The course of the preferential adsorption of the lignin on the cellulose sheet was followed by examination in ultraviolet and visible light alternately. The appearances of the various zones in both kinds of illumination and in wet and dry conditions were noted and compared. While the filter paper had a dark violet fluorescence, the appearances of the various zones were recorded as they appeared on a comparative basis without allowance for possible modification of the fluorescence color by the fluorescence of the cellulose.

Additional suggestive notes on the technics of observation have been reported *(1)*. Solvents other than butyl acetate were also employed with somewhat similar results. It should be noted that the technique described above differs from that of earlier experiments *(1)*. The previous method employed a dry spot of lignin at the beginning of the chromatography while the present method employs a spot of lignin still wet with the dioxane solvent.

Both methods are valid but it is difficult to compare the two since somewhat different conditions prevail during the adsorption. Greater ease of duplication, somewhat different resolution zones, and similar considerations recommended the latter method for this study. It should be noted that all chromatograms were prepared upon the same batch of filter paper, each solvent was purified in a 30 plate column and used from a single

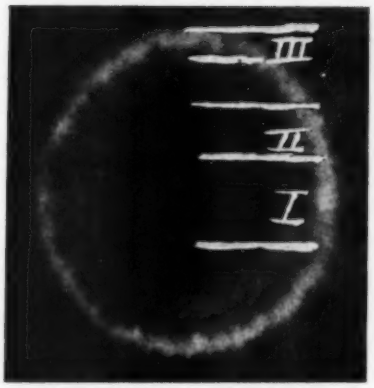

Fig. 6—Mixed chromatogram of fir and spruce (Zones I, II, III, and IV)

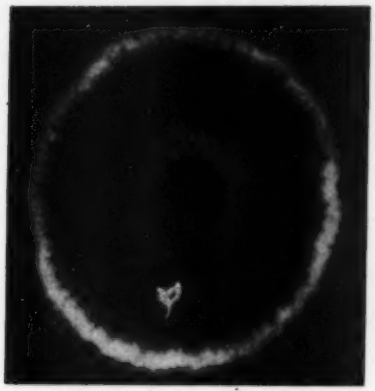

Fig. 7—Mixed chromatogram of fir and spruce (Zone III)

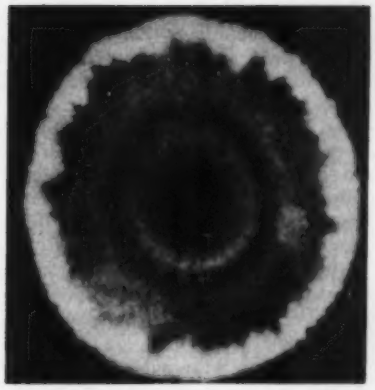

Fig. 8—Mixed chromatogram of non-corresponding zones (III of fir and II of oak)

bottle, and all observations were made simultaneously or under identical conditions so that changes which might influence the adsorption, fluorescence intensity or hue, etc., were either eliminated or held constant.

The source of ultraviolet light was a Hanovia high pressure electronic discharge quartz mercury arc, No. S353, with filter No. Sc. 5032 transmitting radiations largely at a wavelength of 3660 A.U.

Chromatographic behavior of lignin

Comparative chromatographic behavior of the lignin preparations from the six different genera is shown in Table 1. No two of the six lignin preparations behaved in precisely the same manner. Lignin of aspen and oak possessed three chromatographically heterogeneous zones; lignin of the remaining four genera had four such zones. Differences between zones were greatest when observed in ultraviolet light although some of the differences were also apparent in visible light. In ultraviolet light no single zone had a constant appearance for all six genera. The corresponding zones of some of the six genera were so nearly identical as to be non-distinguishable; for the remaining genera the appearance varied from distinguishable to widely different. Fluorescence colors included bluish white, white, brown, yellow, tan, purple, and intergrading hues. Typical chromatograms are shown in Figures 1 to 3.

Some general similarities existed in corresponding zones of different genera. Zone I (ultraviolet, wet) usually appeared as a medium to dark brown fluorescence although that from pine was a bright fluorescent tan. Zone II was commonly a dark brown fluorescence although that from fir was distinctly reddish brown while this zone was absent from aspen. Zone III was usually a yellowish fluorescence when wet which changed to light brown or tan fluorescence when dry. This zone was absent in oak. Zone IV was a white or bluish white fluorescence which became invisible or nearly so upon drying. Some or all of the fluorescence reappeared when the chromatogram was suspended in air saturated with the vapor of butyl acetate. The chromatograms of fir and spruce resembled each other generally while that of pine was markedly different. None of the angiosperms had close similarity to each other but did have some over-all similarities. Zones I, II, and IV of birch closely resembled the corresponding zones of fir and spruce but Zone III was more similar to the corresponding zones of pine and aspen.

The usual effect of the evaporation of the solvent upon the fluorescence was to decrease the intensity, often a small change in hue accompanied the drying. This was not necessarily true since the substitution of methanol for butyl acetate with fir lignin generated four zones generally similar to those obtained with butyl acetate except that Zones III and IV were reversed in position, and the zone of white fluorescence (Zone III with methanol) unexpectedly was invisible when wet and strongly fluorescent when dry. The chromatogram is illustrated in Figure 4. A somewhat similar effect was encountered when double development, i.e. with one solvent, dried, then a second development with the same solvent, was employed with pine lignin, as shown in Figure 5. Zones III and IV of the first development were reversed in position. The original Zone IV was invisible when dry but after the second development gave a strong white fluorescence when dry. Strain *(2)* has discussed the conditions which influence the sequence of zones.

As a test of the identity or non-identity of the material in the corresponding zones of different genera, zones of high visibility were cut from the paper support with scissors. These central circles and exterior annuli were then extracted individually by capillarity with dioxane, the extracts from two corresponding zones mixed, and a mixed chromatogram prepared. The chromatographic behavior and fluorescence properties of the corresponding zones of fir and spruce lignins possessed greater similarity than did most of the lignin preparations investigated, hence, the corresponding zones of these two genera were selected initially for the mixed chromatograph technic. Zones I, II, and III of fir and spruce were separated as outlined above. The results of these mixed chromatograms follows:

(1) A mixed chromatogram of Zone I generated two zones of rather low definition having the same general appearance in ultraviolet light as the original zones. The appearance of the original zones was so similar that it was not possible to decide the relative position of the respective zones in the mixed chromatogram. Figure 6 illustrates this chromatogram. Zone I. The white fluorescent outer zone in mixed chromatograms was due to non-quantitative adsorption of Zone IV. The dark central spot represents Zone I of the mixed chromatogram, and the immediately adjacent band, Zone II. The fluorescent white outer zone (III) in this, as in other mixed chromatograms, was due to non-quantitative adsorption of Zone IV of the original chromatograms.

(2) A mixed chromatogram of Zone II generated two zones of exceptionally clear definition having the general appearance of the original zones. Like the mixed chromatogram of Zone I, the similarity of appearance of the two original zones precluded a decision as to the relative position of the respective zones.

(3) A mixed chromatogram of Zone III resolved two zones of low definition having the same general color characteristics as the original zones, shown in Figure 7. The relative position of the respective zones could not be determined. Several replicate chromatograms of all of the above were prepared.

In addition to the two zones noted in the above cases, a third zone of white fluorescence was unexpectedly encountered. Subsequent investigation of this

phenomenon by chromatographing the extracts of the original Zones I, II, and III separately and alone, generated two zones instead of the one expected, the outer one showing white fluorescence. Serial isolation and chromatographing of the inner zone alone, showed that the outer zone of white fluorescence disappeared in the second or third chromatogram. It thus appeared that the third zone of white fluorescence which appeared in the mixed chromatograms was due to non-quantitative adsorption of Zone IV in the original chromatogram of the lignin material.

Experiments were subsequently conducted on the various zones of the lignins of the other genera studied. Examination of the mixed chromatograms showed general separation into two zones of distinct definition; in a few the resolution of the zones was so indistinct that it was impossible to decide whether two chromatographically heterogeneous materials were actually present.

Mixed chromatograms of *non-corresponding* zones (e.g. I and III instead of I and II) from different genera invariably showed clear-cut resolution into two zones without exception (Figure 8). The central spot is Zone 1; the narrow dark ring is Zone II. In all, 28 mixed chromatograms, not including replicates, were prepared. To prepare all the mixed chromatograms possible with the zones shown in Table 1 would require 208 tedious and time-consuming experiments.

The experimental evidence seems clearly to indicate that the lignin preparations studied consist of chromatographically different components which differ from the components of other genera as well.

The quantities of lignin estimated to be present in the various zones varied considerably from genus to genus, indicating quantitative as well as qualitative dissimilarity. These estimates are recorder in Table 1. It appears logical and probable that quantitative dissimilarity would exist with qualitative dissimilarity. Thus, quantitative dissimilarity may represent secondary supporting evidence of the non-identity of the components of the lignin preparations from different botanical sources.

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Temperature correction nomograph for sulphite freeness

(Williams Precision Freeness Tester)

R. C. RHODES and D. S. DAVIS
Virginia Polytechnic Institute

▶▶▶ Freeness tests are not always made at the standard or reference temperature. For purposes of comparison such freeness values are corrected to the standard temperature. It is the purpose of this paper to present a nomograph that enables convenient correction to 25 C. in the case of the Williams Precision freeness tester *(1)* operating on sulphite pulp.

For this tester it has been shown *(3)* that the freeness of sulphite in linear with temperature between 15 and 35 C. and that the freeness—temperature curves for this range appear to converge at 61.5 C. and 2.9 seconds. Correction of freeness values to the standard temperature, 25 C., can therefore be expressed by the equation

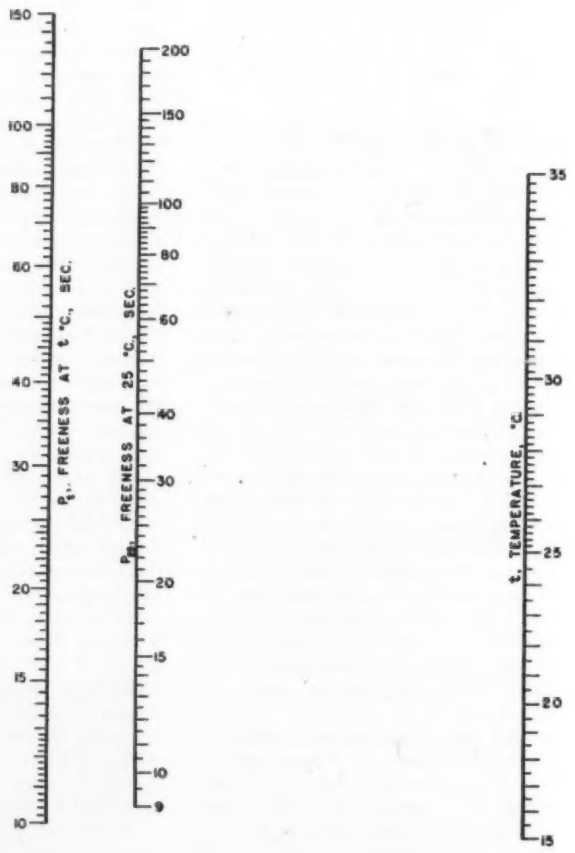
$$P_{25}=36.5\left(\frac{P_t-2.9}{61.5-t}\right)+2.9$$

where P_{25}=freeness in seconds at 25 C. and

P_t=freeness in seconds at t C.

This equation can be solved rapidly and accurately by means of the accompanying logarithmic nomograph which was constructed by methods described previously *(2)*.

The use of the chart is illustrated as follows: What is the freeness of a sample of sulphite pulp at the standard temperature of 25 C. when the freeness as determined at 20 C. is 60 seconds? Connect 60 on the P_t scale with 20 on the t scale and read 53 seconds as the desired value on the P_{25} scale. What is the freeness of a sample of suphite at 28 C. when the freeness at 25 C. is 43 seconds? Connect 28 on the t scale with 43 on the P_{25} scale and read the freeness at 28 C. as 40 seconds on the P_t scale.



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Maintenance work load

STEPHEN C. HAMLIN
Wallace Clark & Company

Analysis of the total work load and its relation to manpower are basic requisites for maintenance planning

▶▶▶ IN TERMS OF MAN-HOURS, how many maintenance departments can state exactly the amount of work that is ahead of each craft?

Very often this question is shrugged off with a reply: "It is simple for any industry other than ours, but *ours* is different. You just can't measure it!"

Following the principles of planning already set forth in previous articles, this measurement is comparatively simple even for *our* industry. One thing, of course, it does require a sincere effort on the part of the responsible maintenance executives—foremen and supervisors—to show accurately what their craft work load is at the end of predetermined load-reporting - periods. Successful Load Tabulations can be prepared from information which the conscientious foreman-planner team prepares in carrying out the day-to-day planning routine.

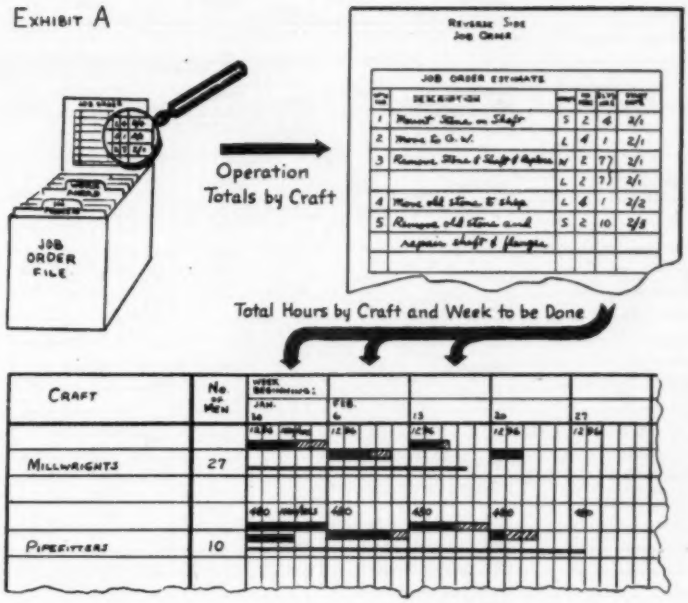
Foundation required for accurate load reporting

Let us review briefly the prerequisites for accurate maintenance load information:

1. An adequate Job Order form.
2. Estimates covering the approximate man-hours and crafts involved for each Job Order received.
3. A filing system placing these Job Orders and estimates in their proper order of priority based on dates wanted as specified by the originator of the order.
4. A method for reserving time for each operation based on estimates, to show graphically when maximum capacity is reached for each craft.
5. An *order of work* issued to crafts in advance of work to be performed, preferably a day ahead to allow for adequate preparations.

Following through with the above, the foreman is aided materially in *making* promises and *keeping* them. By posting progress as the jobs proceed, he notes immediately those jobs falling behind the original estimates, as well as the reason for the delay. The way is paved for appropriate executive action either on his part, or higher up the management ladder, as the case may be.

EXHIBIT A



Thus he effectively executes the short-range planning, at the same time laying a foundation for the longer range maintenance load information which, in retrospect, makes this day-to-day planning easier and more accurate.

Remember, the more accurate this information is the more promises he can make and keep, still with maximum economy and without *temporary* force additions which have a habit of becoming *permanent*.

Size your forces to the job at hand

Accurately sizing your forces to the job at hand is a difficult, but necessary, prerogative of sound maintenance management. In the paper industry it is just as important to know the load ahead of the maintenance forces as it is to know your pulp requirements and schedules for the paper machines. If raw material, machine capacity and man-power requirements, maintenance, or production, are not carefully preplanned, there are bound to be resulting inefficiencies, broken promises, delays, off-quality goods, poor machine utilization, et cetera.

It is a constant worry to management that maintenance crews are oversized. Much has been written on the subject of sizing the maintenance force, and several empirical formulae have been devised to aid in this effort. More times than not these formulae are not readily workable. In the last analysis, the size of the maintenance force can be determined only if the work load is known.

Using the working tools described above in conducting the daily planning, figures can be taken off the estimates at any time to show the total work required to place the mill in first class operating condition. This information, when presented in the form of a Load Chart, provides a management tool for sizing the forces.

This chart shows graphically the number of man-hours required in future weeks to perform the routine work of inspections and minor adjustments, overhaul and repair work, and construction or alteration jobs.

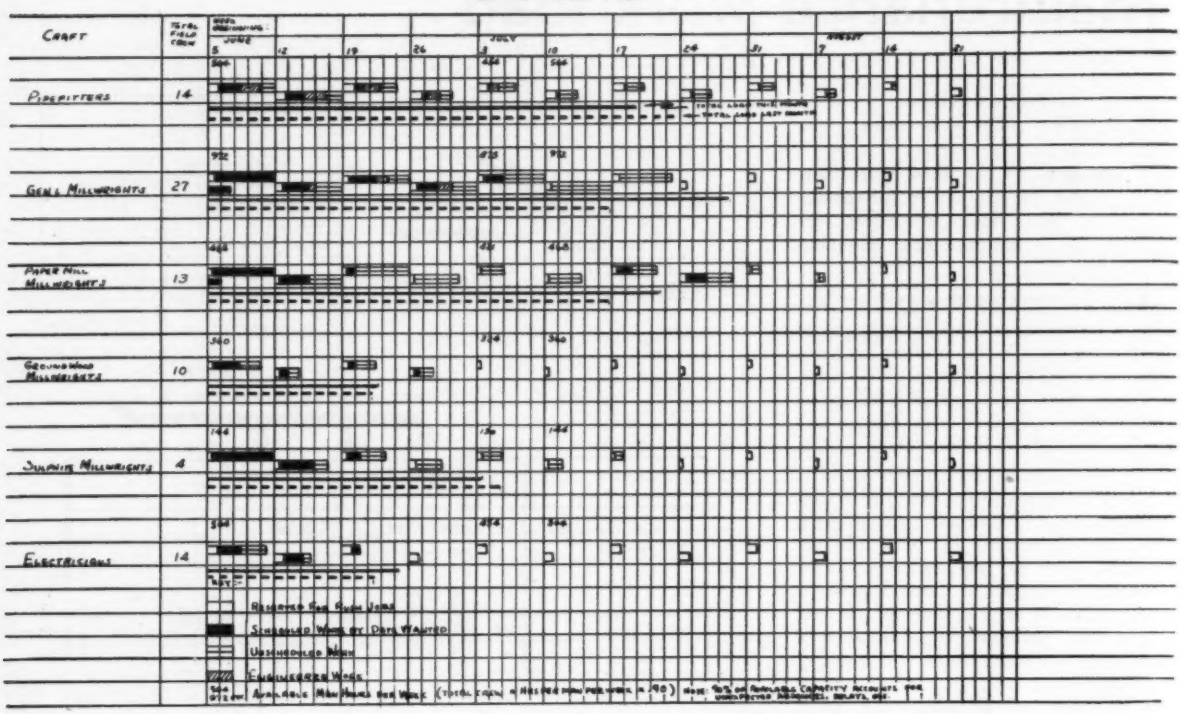
Any maintenance force requires some backlog or mix of work so that they can perform economically. What this normal backlog should be must be determined through experience. In most plants a three to six week backlog is considered normal. If this load increases, steps must be taken through overtime, force additions, or subcontracting, to reduce the load back to normal. If the load decreases below normal, consideration should be given to adjusting the forces downward.

Show relation of known maintenance task to time

For many years the Load Chart has been an accepted and vital technic in the operation of a well rounded production planning and control program.

EXHIBIT B

SUMMARY LOAD CHART



It was a logical step to adapt this management tool to perform a similar job for the maintenance *production* executive. After all, the maintenance superintendent shares a parallel responsibility with the production superintendent in keeping his company management and operating supervisors informed as to the periodic status of work ahead of the maintenance department.

His objective in borrowing from the production load reporting technic are as follows:

1. To show graphically, by craft, a summary of all anticipated maintenance work ahead of the mill.

2. To show *when* this work is wanted and how much of the available capacity is required to perform such work.

3. To enable him to make accurate promises on requests received and accepted for projects to be undertaken at a later date.

4. To substantiate recommendations for overtime or subcontracting to relieve periodic peak loads, or recommendations for force additions, should the available capacity of a craft or crafts show a chronic overload.

5. To show load trends between crafts as well as for total maintenance forces.

Exhibit "A" shows briefly how the Maintenance Load Chart is prepared. Based on the labor estimates for each job, the craft man-hours are totaled and extended graphically through spaces representing both time and capacity.

For example, there are twenty-seven millwrights, or 1296 millwright man-hours available for the week beginning January 30. 1296 millwright man-hours available for the week of February 6, et cetera.

The heavy shaded portion represents maintenance work planned (and in effect contracted for by the responsible maintenance foreman) for that week in which it appears.

The cross-hatched portion represents larger jobs which have been released by the engineering department, also contracted for or promised for completion, during that period on the chart in which it appears.

The narrow horizontal line shows total time it would take to complete the work alloted to each craft, or in other words, the total of all the heavy shaded and cross-hatched lines together.

Thus, the total load for millwrights extends through two and one-half weeks; the load for pipefitters, over four weeks.

Note that the pipefitter load exceeds 150 per cent of available capacity. Obviously, if that work is to be completed, overtime will be required during the week of January 30. The alternative would be to renegotiate the dates wanted as requested by the originator of the order, and spread this work out into later weeks. If this condition persisted, however, additional force would be required to complete the work in hand.

Notification of this sort does much to promote good relations between operations and maintenance, keeping the operating supervisors informed on the status of their work, although relieving them of *detail* maintenance follow-up at the expense of other more important production duties.

The load for an entire plant is shown in Exhibit "B." Superimposed on this chart is the total load for each craft for the previous month as against the current month. This appears as a broken line under the shaded, total line, and shows a load comparison for each craft for each succeeding month.

As experience is gained and trends are established for crafts and the plant as a whole, the Maintenance Superintendent and Maintenance Foremen have factual information upon which to base their recommendations. They have their hand, so to speak, on the pulse of the maintenance organization.

With this load information contributing to the longer range aspects of the maintenance plans, the responsible supervisors have established a series of checks and balances, in effect a warning system used to point out difficulties to management before any damage has been done. In carrying out these responsibilities they are contributing their full share to their important place on the management team.

✦ PAPER SKETCHES ✦

PAPER wrappers for drinking straws, that kill germs on contact, have been developed and are now being offered to public eating places.

IN ANCIENT ROME men were hired for the express purpose of gluing together sheets of papyrus to make long continuous scrolls.

Before the 1890's, curd, or pot-cheese, it is claimed, was used in a few mills for coating paper.

TO INDUCE papermakers from Samarkand to come ply their trade in Kashimir, King Zain-ul-ab-ad-din, in the mid-1400's, offered them grants of property.

Superintendents Association holds 31st

▸▸▸ MORE INTEREST manifested in papers presented established a new trend in convention procedure at the 31st annual meeting of The American Pulp and Paper Mill Superintendents Association, held at the Edgewater Beach Hotel in Chicago, June 8 to 10, 1950. This was the third annual meeting held at the Hotel, and the fifth in Chicago, where the Association was organized in 1919.

Nothing was spared on the part of both the Association and its Affiliates to make this convention as enjoyable as such events always have been during past years, but there was an added interest in the business sessions and a better attendance at the group meetings. Special planning on the part of the Association officers unquestionably accented this phase of the convention and it is believed this effort will set the pace for bigger and better conventions in the years to come.

Highlighting the agenda of the three-day convention were:

Nine group meetings where approximately 38 papers were presented

Two general conferences

Affiliates dinner

Cocktail party and banquet . . . the big social event

Joint luncheon . . . with headline speaker

Visits to mills and printing plants in Chicago

Golf and sports events

Ladies program . . . Sightseeing, tours, entertainment, luncheons

At the first session of the Association on Thursday morning, President Charles H. Reese presided and delivered his report. Some salient points from the President's address were:

"one or more of the national officers attended at least one divisional meeting during the year."

"divisions all reported good attendance at meetings during the year, indicating special interest of the members in the affairs of their region."

"from the meetings held with officers of the several divisions, it was clear that more papers by operating superintendents should be given at all Association meetings. . . . Maximum benefit results from meetings when a large number of operating men attend and participate in the discussions. To meet these requirements, your national officers early last fall outlined a program for our Chicago meeting."

"the Association now has 1523 active members as compared with 1442 a year ago. The past year also has witnessed a healthy growth in our Affiliate group. Last year at convention time, there were 148 Affiliate members. At present, we have 166 members."

Officers Elected—

Election of new national officers of the Association was the top feature at the Business Meeting held on the first day of the convention. The following panel was elected to serve for the coming year:

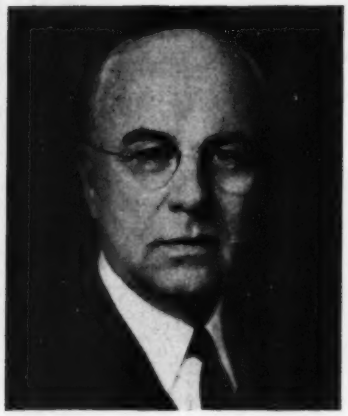
President—Charles E. Ackley, Crown Zellerbach Corp., West Linn, Ore.

First Vice President—Glen Sutton, Sutherland Paper Co., Kalamazoo, Mich.

Second Vice President—Gordon K.

Charles H. Reese presided as president of the Association during 31st Convention

Charles Ackley, first vice president for the past year is Association's newly-elected president



George W. Craigie has resigned as secretary-treasurer of the Association

Harry E. Weston, associate secretary-treasurer succeeds Mr. Craigie

annual meeting in Chicago

Singletary, Brunswick Pulp and Paper Co., Brunswick, Ga.

Third Vice President—Donald Dick, Howard Smith Paper Mills, Ltd., Cornwall, Ont., Can.

Fourth Vice President—Harry E. Hadley, Gardner Board and Carton Co., Middletown, Ohio.

Fifth Vice President—Howard H. Street, National Vulcanized Fibre Co., Yorklyn, Del.

Board of Directors—Raymond F. Bennett, Ecusta Paper Corp., Pisgah Forest, N. C., and Oscar Stamets, formerly of Riegel Paper Corp. (now retired).

Craigie Resigns— Weston Succeeds Him

At a meeting of the Board of Directors which preceded the opening of the convention, an important official change became effective. George W. Craigie, who has served as secretary-treasurer of the Association since the retirement of Robert L. Eminger in 1944, resigned that office effective August 1. Mr. Craigie first came with the Association in 1936 as field secretary. Since he took over the full duties of secretary-treasurer in 1944, the Association's office has been located in New York City.

Succeeding Mr. Craigie is Harry E. Weston, who has served as associate secretary-treasurer since February, 1948, with offices located in Chicago. With Mr. Weston's election, the Board decided to move the Association's headquarters from New York City to Chicago on September 1, 1950.

Mr. Weston has been a member of the Association since 1924. He is a graduate of the New York State College of Forestry and taught papermaking courses there from 1920 to 1926. During his pre-college years, Mr. Weston had practical experience in the industry. In 1927 he became associated with THE PAPER INDUSTRY magazine and was associated with its publisher in various capacities until he left to become an official of the Association in 1948. As editor in chief of a publication in the field, he became widely known both among the mill organizations and affiliates. He was a constant contributor to the literature both through the trade press and other media.

Affiliates Elect

Special event for the Affiliates was the dinner meeting held on Wednesday evening just before the Convention opened formally. Headline speaker, chosen from the Affiliates group was Frank W. Lovejoy, of the Socony-Vacuum Oil Co., New York City, who spoke on the subject "It's Later Than You Think."

New officers elected to the Industrial Affiliates Committee by the Affiliates for the coming year are:

Chairman—Allan Hyer, Bagley & Sewall Co.

First Vice Chairman—W. K. Metcalfe, J. O. Ross Engineering Corp.

Second Vice Chairman—Walter Morehouse, Nopco Chemical Co.

A. M. Cooper, Westinghouse Electric Corp.; C. D. De Mers, Taylor Instruments Co.; R. T. Kidde, Hills-McCanna Co.; J. H. Loomis, American

Candid Camera at the Superintendents

Harry W. Moon, D. M. Bare Paper Co.; J. C. Goodale, The Louis Allis Co.; O. J. Malina and C. E. Stakey, D. J. Murray Mfg. Co.

Roland Wilber, Southern Paperboard Corp.; Gordon K. Singletary, Brunswick Pulp & Paper Co.; W. E. Greene, W. E. Greene Corp.

C. F. Kingston, Hammermill Paper Co.; C. H. Reese, Nekoosa-Edwards Paper Co.; C. R. MacDonald, Flintkote Co.; Charles Riper, Moraine Paper Co. Div., American Envelope Co.; Arthur Coleman, Ciba Co.

L. V. Thiel, F. C. Huyck & Sons, F. L. Buchanan, Waldorf Paper Products Co.; Harvey Berg, National Aluminate Corp.; Richard Tutt, Peter Cooper Corps.; Dr. Truman A. Pascoe, Nekooska-Edwards Paper Co.

Leonard Hank, National Gypsum Co.; W. A. White, Jr., Shartle Bros. Machine Co.; Joe Loomer, Robert Gair Co.; Jas. Harrison, Michigan Carton Co.; Geo. C. Ehemann, Ohio Box Board Co.; John E. Burdsall, Crystal Tissue Co.

1st row: Mrs. R. E. Briggs; H. M. Breyfogle, Alton Boxboard Co.; Mrs. Leo White; Mrs. L. H. Breyfogle. 2nd row: R. E. Briggs, Draper Bros.; Jimmy Rhodes, Volney Felt Mills; L. H. Breyfogle, Draper Bros.; Sylvester Cottrell, Natl. Aniline & Chem.; 3rd row: Buster Griffiths, Williams-Gray; N. J. Niks, Munising Paper Co.

Get-together Party–Edgewater Beach Hotel

C. L. Durkee, D. J. Murray Mfg. Co.; Earle E. Warner, General Electric Co.; Frank Kreiling, Thilmany Pulp & Paper Co.

J. M. Kahn, Infilco; J. W. Mulligan, Mulday Associates; Mr. and Mrs. F. O. Sullivan, Infilco; Mr. and Mrs. MacDonald, Ohio Knife Co.

Gordon Morseth, Detroit Sulphite Pulp & Paper Co.; Mrs. Harry Morseth; E. L. Tucker, Stebbins Engineering & Mfg. Co.; Mrs. Gordon Morseth; Mrs. and Mr. Roy Davis, Detroit Sulphite Pulp & Paper Co.

Ross H. Lawrence, Williams-Gray Co.; Mrs. and Mr. E. T. Fleming, Jr., Fleming & Sons, Dallas, Texas

Mrs. and Mr. Frank Kreiling, and Miss Margaret DeJonge, Thilmany P & P Co.; H. A. Skinner, Marathon Corp.; Miss Dorothy DeJonge, Thilmany; J. D. Stephens, Babcock-Wilcox Co.; Mrs. and Mr. Paul West, Thilmany P & P Co.; Harry Anderson, Link-Belt Co.; Mrs. and Mr. Ray Totten, Ciba Co.

Sylvester Cottrell, National Aniline & Chemical Co.; Mrs. and Mr. Arnold Weller, Sutherland Paper Co.; Mrs. A. M. Mausoff; Mr. and Mrs. Lester LaLiberte; Kalamazoo Vegetable Parchment Co.; A. M. Mausoff, Fletcher Paper Co.

Superintendents Convention . . .

Cyanamid Co.; Howard Roderick, Wyandotte Chemicals Corp.; L. M. Woodside, Albany Felt Co.; F. A. Soderberg (Ex-Officio), General Dyestuff Corp.

Banquet and Party

Time for fun and good fellowship might well describe the annual get-together party which preceded the banquet. This interlude of relaxation has become a regular feature of the annual conventions. Sponsored by the Affiliates group, these get-togethers have done much to foster and maintain a feeling of good will within the Association and to attract new faces and names that will subsequently be well known within the industry. The banquet was, as usual, well attended, and the party beforehand lacked nothing to make it truly a festive occasion.

Presiding President Charles Reese streamlined all of the ceremonies and introductions in a most efficient manner. At the speakers' table on the dais in the Grand Ballroom of the hotel were seated the Association officers, past presidents and distinguished guests. There was no special speaker on this occasion.

Miscellany

Missing from the convention this year were the Emingers—well known to all who attend the annual meetings regularly. Prior to his retirement in 1944, Mr. Eminger served the Association as secretary-treasurer, and he and Mrs. Eminger always have attended the conventions. However, this year, the state of her health caused them to miss this pleasure. Best wishes from all those present were sent to them.

Always a familiar figure at the meetings is Fred C. Boyce, first president of the Association. Other past presidents seen this year were: W. H. Brydges, R. L. Barton, Raymond T. Bennett, E. T. A. Coughlin, Oscar Stamets, F. L. Zellers, Grover Keeth, H. H. Harrison, and Herbert Randall.

Also at the meeting and welcomed by his many friends was D. C. Everest, chairman of the board, Marathon Corp. Mr. Everest is a past president of the American Paper and Pulp Association.

The 32nd convention of the Association will be held June 24-29, 1951, at the Multnomah Hotel, Portland, Oregon.

Newly-elected officers of the Kalamazoo Valley Section of TAPPI are (L to R): Tom Luey (Sutherland Paper Co.), corres. sec.; Phil Nethercut (Watervliet Paper Co.), rec. sec.; William Sprau (National Gypsum Co.), treas.; Dr. J. J. Harrison (Michigan Carton Co.), chmn.; John Dam, Jr. (Allied Paper Mills), v. chmn.

Committee in charge of golf tournament held by Kalamazoo Valley section of TAPPI at Kalamazoo included (L to R): C. B. Smith, Noble & Wood Machine Co.; Richard Trelfa, Hercules Powder Co.; William A. Honey, Stowe & Woodward, Inc.; and Charles E. Mueller, Elof Hanson Inc., who was chairman of the committee.

Kalamazoo TAPPI Meets For Golf Tournament

At the annual meeting and golf outing held at the Gull Lake Country Club, Kalamazoo, Mich., June 1, Dr. James J. Harrison, Michigan Carton Co., Battle Creek, Mich., was elected chairman of the Kalamazoo Valley section of the Technical Association of the Pulp and Paper Industry.

John Dam, Jr., Allied Paper Mills, Kalamazoo, was elected vice chairman. The former position of secretary was divided into two offices, Philip Nethercut, Watervliet Paper Co., Watervliet, Mich., being elected recording secretary, and Thomas Luey, Sutherland Paper Co., corresponding secretary. William Sprau, National Gypsum Co., was elected treasurer. Dr. Stephen I. Kukolick, retiring chairman, automatically becomes a member of the board of directors.

More than 140 men, including mill executives and suppliers' representatives, attended the dinner; of these, about 110 entered the golf tournament. John Hayes, Appleton, Wis., and Joel Shepherd, Kalamazoo coal dealer, tied for low gross; Jack Hartung, St. Regis Paper Co., won the blind bogey; Jack Brenner, Wyandotte Chemical Co., took low net; and Lee Mimms, Kalamazoo Paper Co., qualified for his prize with high gross. The shuffle board contest was won by George H. Gerpheide, Jr., Hawthorne Paper Co., and Robert Ronnigen.

C. E. Mueller, Elof Hanssen, Inc., was in general charge of arrangements. Mr. Mueller was assisted by Richard T. Trelfa, Hercules Powder Co.; William Honey, Stowe and Woodward, Inc.; and C. B. Smith, Noble and Wood Machine Co.

THE PREMIER AWARD FOR business paper campaign, product advertising in industrial publications, was recently awarded Calco Chemical Division of American Cyanamid Co., Bound Brook, N. J., for the ad series "Calco Dyelines," by the National Advertising Agency Network. There were 275 entries in the contest, awards for which were presented at the association's nineteenth annual conference held at Montebello, Que.

TWO AWARDS HAVE BEEN given by the Folding Box Association of America to Fleishhacker Paper Box Co., San Francisco, in the 1950 competition conducted by the association. The Fleishhacker firm has won six packaging awards in the past three years.

Three Supts. Divisions Plan Fall Meetings

Northeastern Division—The 1950 Fall Meeting of the Northeastern Division will open Thursday, Sept. 21, and conclude on Sept. 24. Details of the program, as well as place of meeting, will be announced at a later date.

Joint Fall Meeting of the Southern and Southeastern Division—These two divisions will meet jointly in Asheville, N. C., October 12-13-14. An interesting and informative program is being planned for an expected large attendance.

Headquarters of the meeting will be at the George Vanderbilt hotel in Asheville, but both the Battery Park hotel and the Langren hotel are co-operating in arrangements. Reservations for rooms at one of these three hotels should be made directly with the preferred hotel.

Coming Events

Aug. 7-20—First United States International Trade Fair, to be held in Chicago.

Sept. 5-9—Sixth National Chemical Exposition by Chicago Section of the American Chemical Society, at the Chicago Coliseum.

Sept. 11-23—Sixth Educational Graphic Arts Exposition, to be held at the International Amphitheatre, Chicago.

TORRINGTON SPHERICAL ROLLER BEARINGS

allow smooth rolling for better paper finish

On intermediate rolls of Appleton Machine Company's Supercalender Stacks, Torrington Spherical Roller Bearings help eliminate roll crowding by maintaining constant across roll alignment. Improved and more uniform supercalender finishes result.

In addition, these smooth-rolling, self-aligning bearings help reduce starting torque, help cut losses from snap-offs, reduce power comsumption and give long service life. Rapid roll changes are possible because no alignment adjustments need be made.

On the bottom and top rolls of these supercalenders, Torrington Tapered and Straight Roller Bearings are used on the drive and front side respectively. For bearings that will meet *your* exact requirements, consult our engineers.

THE TORRINGTON COMPANY

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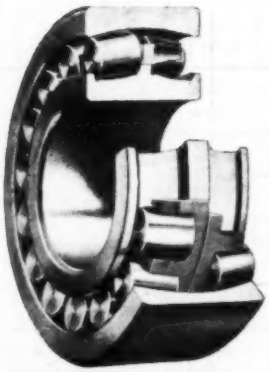
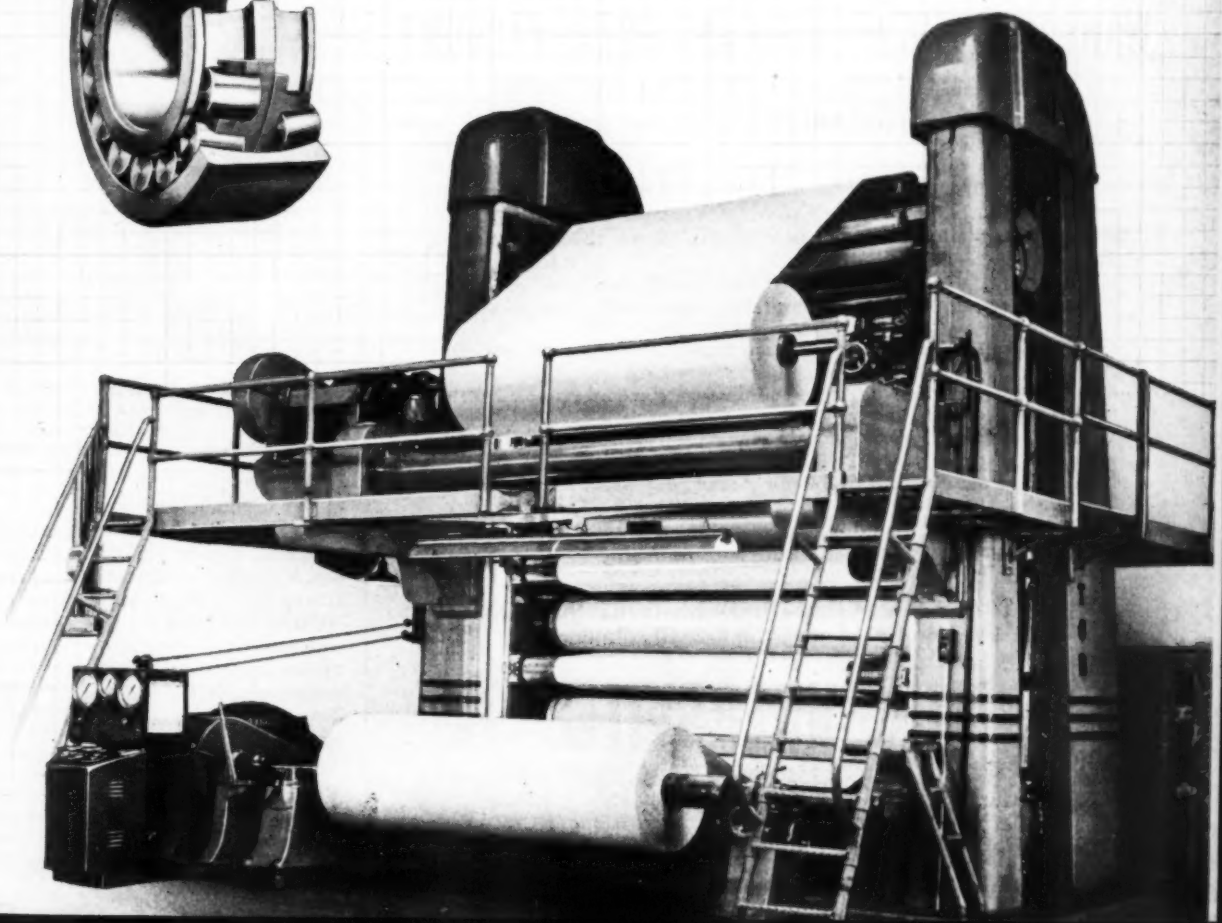


TORRINGTON *SPHERICAL ROLLER* **BEARINGS**

SPHERICAL ROLLER • TAPERED ROLLER • STRAIGHT ROLLER • NEEDLE • BALL • NEEDLE ROLLERS



Sept. 13-15—Second TAPPI Testing Division Conference, to be held at Eastman Kodak Co. plant, Rochester, N.Y.

Sept. 15-16—Annual Fall Meeting of Northwestern Division of the Superintendents Association, at the Schroeder Hotel, Milwaukee, Wis.

Sept. 18-22—Fifth annual Instrument Conference and exhibit, sponsored by Instrument Society of America, Memorial Auditorium, Buffalo, N.Y.

Sept. 21-23—Annual fall meeting of the Northeastern Division of the Superintendents Association, to be held at Poland Spring, Me.

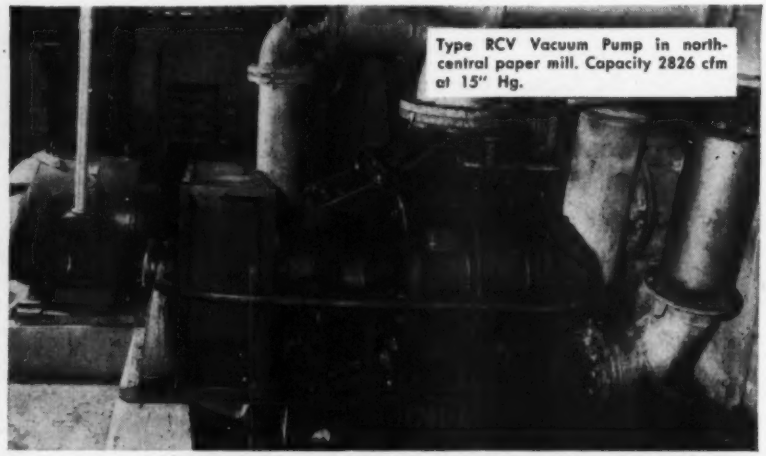
Oct. 2-5—Fifth annual TAPPI Engineering Conference, Netherlands Plaza Hotel, Cincinnati, O.

Oct. 16-20—38th Annual Congress and Exposition of the National Safety Council, Stevens Hotel, Chicago.

Oct. 25-27—Alkaline Pulping Conference of TAPPI, at George Washington Hotel, Jacksonville, Fla.

Nov. 12-13—Fibrous Agricultural Residue Conference of TAPPI, at Peoria, Ill.

April 17-20, 1951—20th National Packaging Exposition of the American Management Association, to be held in Atlantic City, N.J.



Type RCV Vacuum Pump in north-central paper mill. Capacity 2826 cfm at 15" Hg.

WANT TO COMBINE COUCH AND PRESS VACUUM?

Then look into the wide line of Vacuum Pumps built by ROOTS-CONNERSVILLE for just such jobs.

Handling the combined vacuum requirements of both couch and press rolls can sometimes be done economically and dependably with one Roots-Connersville Cycloidal Vacuum Pump. Users find long-time, excellent performance results from these important R-C advantages:

High volumetric efficiencies—accurately maintained clearances, effectively sealed by water, insure high efficiencies; air being handled can be dry, or contain vapors or liquids.

Low friction losses—due to no contact between impellers or impellers and casings.

High speeds—permitting direct connection to standard motors, saving first cost, space, and weight.

Flexibility—to meet varying vacuum requirements; suction automatically created to overcome resistance in system.

Durability and dependability—simplified design and construction for long-time, attention-free operation.

Tell us what your vacuum requirements or pump problems are and we'll help you find a satisfactory solution that's suited to your needs, without obligation.

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506 Monroe Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE

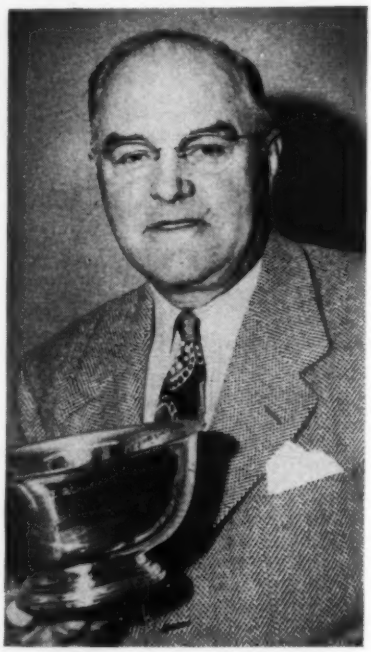
BLOWER BUILDERS SINCE 1854

ONE OF THE DRESSER INDUSTRIES

Paper and Twine Ass'n Award for 1950 Given To Earnest E. Ludwig

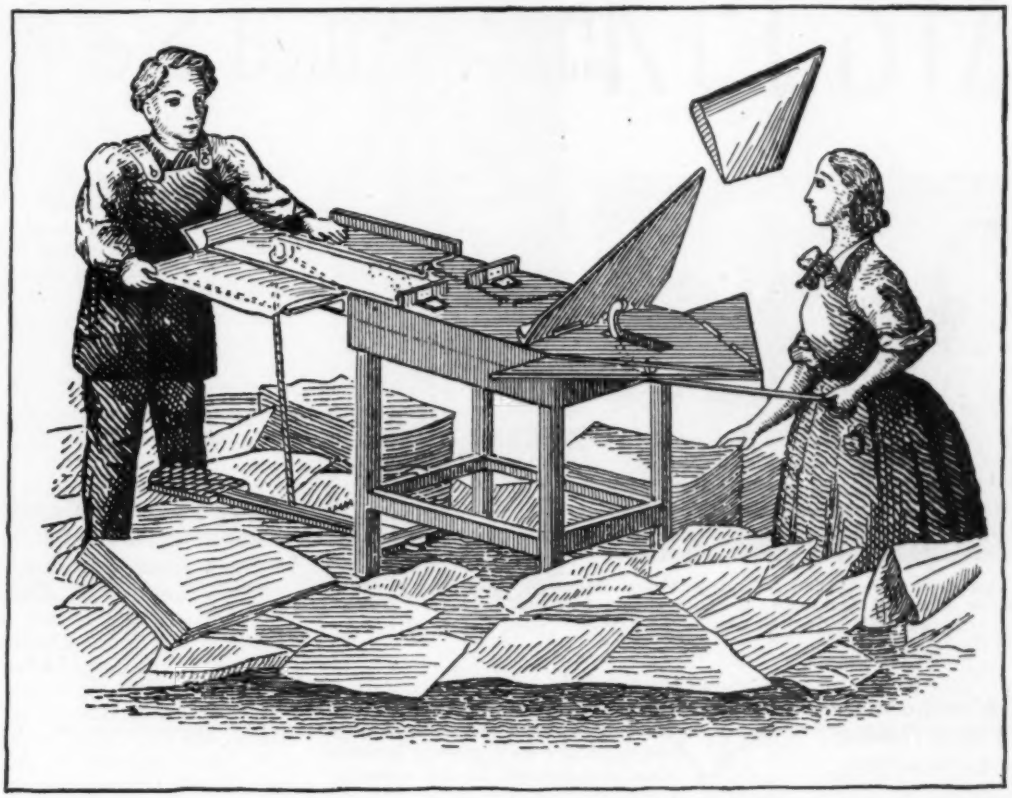
The Paper and Twine Association has honored Earnest E. Ludwig, Kalamazoo, Mich., manager of Bermingham and Prosser Co., for his "outstanding accomplishment in establishing the course in pulp and paper technology at Western Michigan College in 1950." At the recent annual convention of the association at French Lick, Ind., Mr. Ludwig received a sterling silver bowl inscribed with this accomplishment.

Mr. Ludwig, who is not a member of the Association, was unanimously chosen for the award above thirteen other nominees, both members and non-members of the association. The only requirement for consideration for the award was beneficial contribution to the industry at large.



Earnest E. Ludwig, who received 1950 award from the Paper and Twine Association for originating idea of establishing pulp and paper technology course at Western Michigan College

Mr. Ludwig's idea for such a course, he revealed, grew out of his son's desire for such a course near his home. Discussions between Mr. Ludwig and William Kirkwood led to an industry-wide movement which was taken up by the university and a group of industry men in the Kalamazoo Valley. The Association, as additional recognition of the value of the course conceived by Mr. Ludwig, has voted to support a scholarship to the school for one student.



Hand-Operated Bag Machine, about 1835. Illustration from the Bettmann Archive

The Bag Business is Big Business

One hundred sixty years ago, inventors were trying to devise a machine that would shape and fasten a piece of paper to form a paper bag. Hand-operated machines were built about 1835. Then in 1852 Francis Wolle, of Bethlehem, Pennsylvania, patented the first automatic bag-making machine. In 1858 he produced an improved machine which made bags from a running roll of paper, cutting, folding, and pasting in a continuous series of operations.

Great modern machines now turn out millions of bags a day, serving the infinite packaging needs of business. Working their miracles, they form every type and size of bag from tiny glassine containers to giant lined bags that hold and protect precious chemicals. So great is the volume that manufacturers of bags and shipping sacks use more than one million tons of paper each year and play an important part in America's great pulp and paper industry.

The dramatic story of paper is told in the sound-and-color film, "Paper — Pacemaker of Progress," and in a book under the same title. Both are presented by F. C. Huyck & Sons as a tribute to the Paper Industry. The book will be sent free upon request.

F. C. HUYCK & SONS • *Kenwood Mills* • RENSSELAER, N. Y.

KENWOOD MILLS WOOL PRODUCTS

HUYCK *Felts*

The Paper Industry Allied News

Five old-timers at Farrel-Birmingham Co. receive 50-year service awards. L to R: Henry T. King, Roderick R. Hazard, Christopher C. Harris, Joseph B. Wolfe, and Carl F. Schnuck. Presentation of the diamond studded pins was made by Franklin Farrel, Jr. (at right), former chairman of the F-B board of directors

Farrel-Birmingham Honors Old-Timers At Dinner Meeting

The presentation of five 50-year diamond-studded service pins was a highlight of the annual "Old Timers Club" dinner held recently at Farrel-Birmingham Co., Inc., Ansonia, Conn. Carl F. Schnuck, director of engineering; Henry T. King; Roderick R. Hazard; Christopher C. Harris; and Joseph B. Wolfe bring the total of 50-year employees to 20, fifteen of whom are still working with the company.

At the same dinner meeting, Company President Franklin R. Hoadley received a gold wrist watch, token of 35 years spent with the company, as did five other men. Awards were presented by Franklin Farrel, Jr., former chairman of the board and grandson of the company's founder, Almon Farrel.

G-E Plans Improvement Program for Taunton Plastic Division

A million dollar program of improvement will soon be launched at the Taunton, Mass., plant of the General Electric Co. Plastics Division. Nearly all interior sections of the plant will be altered, and equipment will be modernized, to make the Plastics Division one of the largest plastics operations in the country.

Scheduled to be completed about the end of 1950, the expansion and modernization is being done to speed the growth of the G-E plastics business. Other changes will be the consolidation of the manufacture of all molds used in plastic production formerly done at Taunton and Decatur at the Pittsfield plant. Molding equipment will be transferred to Taunton to allow more room at Pittsfield for the eventual expansion of several chemical manufacturing activities.

All consolidating moves are being planned to insure no interruptions of service to clients.

Hammermills Inc. Becomes Wholly-Owned Subsidiary of Pettibone-Mulliken

Headquarters of Hammermills, Inc., have been moved from St. Louis to Chicago with its acquisition by Pettibone-Mulliken Corp., Chicago, as a wholly owned subsidiary corporation.

C. M. Binder, president, and T. A. Oberhellman, vice president and chief engineer of Hammermills, will continue in the same capacity under PMCO ownership. Mr. Binder, who has been associated with the hammermill manufacturing industry for more than 32 years, started Hammermills, Inc., in 1947, developing a complete new line of "Bulldog" Hammermills of the moving breaker plate design. Mr. Oberhellman has worked in the same industry for more than 25 years in design and engineering. He joined Hammermills, Inc., in 1947.

With the acquisition of Hammermills, Pettibone-Mulliken Corp. has obtained the services of the original designers of the moving breaker plate type hammermill and double drive mills; these men now have the complete Pettibone facilities to draw upon as well as metallurgical experience required to furnish properly engineered materials.

Cooper Alloy Foundry Research Contest Prizes Awarded

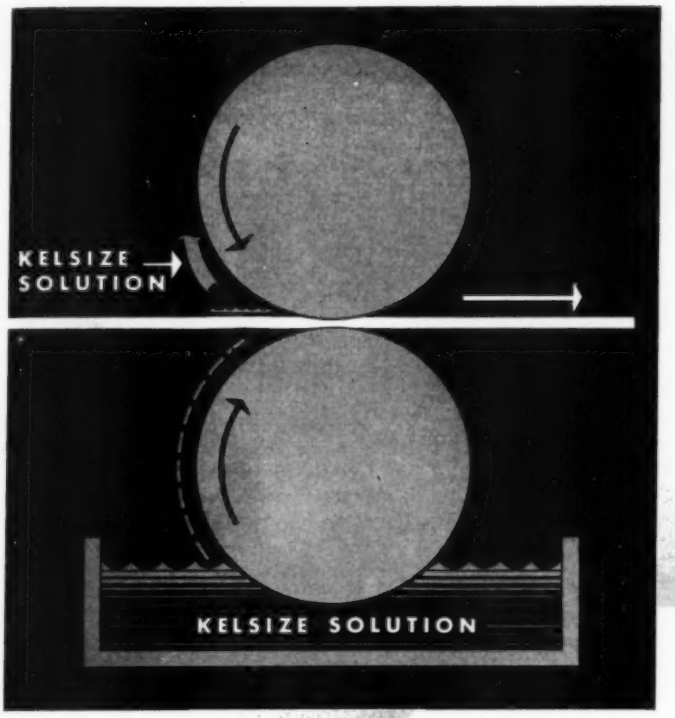
Prizes for the nationwide contest concerning "Applications for Cast Stainless Steel in the Chemical Industry," offered by Cooper Alloy Foundry Co., Hillside, N.J., have been awarded. The contest, which opened Oct. 1, 1949, and closed May 1, 1950, is one of a series sponsored by the company and designed to cover the major fields of application, including chemical, food, paper and pulp, aircraft, petroleum, marine, etc.

First place winner Howard J. Sanders, a chemical engineer associated with Calco Chemical Division of American Cyanamid Co., was awarded $250. Mr. Sanders, a graduate of Cornell University, is known to trade publications readers for his technical articles.

The second prize of $150 was awarded to John D. Altstetter, a metallurgical engineering student studying at Ohio State University; a third prize of $100 was won by a Villanova College student, Max J. Sorenson.

Prizes were awarded on the recommendation of Edmond C. Fetter, managing editor of *Chemical Engineering;* Ted C. Dumond, managing editor of *Materials and Methods;* and Dan W. Talbott, vice president and general manager of Cooper Alloy Foundry Co. Their selections were based on thoroughness of research and clarity of presentation.

CHICAGO LABORATORIES and offices of General Dyestuff Corp., New York, have been moved from 731 Plymouth Court to 310 West Polk St., where the firm will have larger offices and an enlarged laboratory.



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in your sizing solution use...

The Modern Surface Control Agent

FOR BETTER RESULTS ON

Finish • Surface Density • Wax Resistance

FOR

GLOSS INK PAPERBOARD
BUTTER CARTON STOCK
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CARBONIZING PAPER

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20 N. Wacker Drive
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Aries Associates Add Wallboard Dept. And Increase Staff

The recent growth of wallboard manufacture and use in the United States has led to the establishment of a wallboard department by the engineering firm of R. S. Aries & Associates, New York. The new department will handle process evaluation, economic surveys, pilot plant tests and plant design for both hard and soft wallboards. The Aries organization favors no partitcular process, but will provide an impartial service to industry, recommending processes based on minimum cost and product specification.

The men associated with the service have wide experience and successful records in the wood utilization, pulp and wallboard industries. Dr. Robert S. Aries, who has more than 80 technical patents and papers in the field, has been technical director of the Northeastern Wood Utilization Council, New Haven, Conn., for the past decade.

Those associated with Dr. Aries in this endeavor have similar records. Dr. Arthur Pollak, formerly development department director of the West Virginia Pulp & Paper Co., and Vance Edwardes, a superintendent of International Paper Co. and a former president of TAPPI, will handle process work, while Vincent L. Falotico will be in charge of mechanical engineering. Dr. A. Douglas McLaren, formerly associated with duPont, will consult on fundamental problems involving resins, cellulose and lignin.

Equipment of the new department includes a pilot plant which can produce large samples of wallboards from many types of wastes.

MERGER OF Hapman Conveyors, Inc., Detroit, and C. H. Dutton Co., Kalamazoo, Mich., resulted in a new company, Hapman-Dutton Co. The new firm is organized into two divisions, the Hapman Conveyors Division and the Dutton Boiler Division, with the conveyors division having headquarters in Detroit, and the conveyors having headquarters in Kalamazoo. H. W. Hapman is president and general manager of the new firm, and Robert J. Brown is vice president, assistant general manager and treasurer.

THE SECOND HALF of the 1950 maintenance and repair courses conducted by Brown Instruments Division of Minneapolis-Honeywell Regulator Co., Minneapolis, will begin August 14. Classes will be held on a three, five, and 13 weeks basis, with the shorter courses being planned for concentrated product instruction, and the longer courses for more comprehensive training in complete industrial instrumentation. The three week course will start on August 14, and will conclude September 1 and the five-week classes will begin September 11 and October 30, so that the comprehensive thirteen week course may be taken between Sept. 11 and Dec. 8.

LOCATION OF THE San Francisco sales office of the Chicago Bridge & Iron Co. was moved from 22 Battery Street to Room 617, 200 Bush Street, last month. The telephone number, EXbrook 2-8936, remains the same. L. A. Elsener, manager of the office, and Contracting Engineer K. W. Lange, retain their positions.

LAMINATED PLASTICS WILL no longer be fabricated at the Coshocton, Ohio, plant of the Laminated and Insulating Products division of the Chemical Department of General Electric Co., Pittsfield, Mass. The operation, which fabricated industrial parts from Textolite laminates, has been sold to General Laminated Products, Inc., New York. G-E will continue to produce sheets, tubes, and rods, as well as decorative laminated plastics surfacing materials and custom molded laminated products at the Coshocton plant.

A YEARLY SCHOLARSHIP of $375 a semester has been established at Pennsylvania State College by Heppenstall Co., Pittsburgh, in memory of Charles William Heppenstall, Sr., founder of the company. The scholarship will be awarded to a son or daughter of a company employee so that he or she may attend the engineering, metallurgy or business college of the university for eight semesters. The first scholarship recipient will be selected this summer.

CLEVELAND OFFICES of Robins Conveyors Division of Hewitt-Robins, Inc., New York, have been moved from 215 Rockefeller Building to 8905 Lake Ave.

AN AGREEMENT BETWEEN Monsanto Chemical Co., Everett, Mass., and Filtered Rosin Products Co., Baxley, Ga., provides for manufacture of Monsanto's Mersize engine sizing for paper and a combined size of Mersize and standard rosin size for shipment from the Filtered Rosin plant. Purpose of the agreement is to present a combination product which will eliminate the need for two products in mills using Mersize in their central size systems.

THE TWELFTH, AND NEWEST, General Electric Apparatus Department sales district was established March 1. With headquarters at St. Louis, the new district will be known as the Mid-States District.

A NEW WAREHOUSE at 1324 East Breuster Court, Appleton, Wis., has been opened by Merchants Chemical Co., Inc., New York. The office will operate under the management of E. C. Swackhammer, manager of the Milwaukee branch office, and W. A. Jacobs will be the local representative.

EXECUTIVE OFFICES OF R. S. Aries & Associates have been moved from 26 Court St., Brooklyn, N. Y., to 400 Madison Ave., New York 17. General engineering offices and drafting rooms will remain at the old address. The telephone numbers for the new offices, chosen to allow better service to foreign and outstate clients, will be ELdorado 5-1430-1-2-3.

IN A CEREMONY held at the Harrison, N.Y., home offices and plant of Nopco Chemical Plant recently, 11 employees with 15 years of company service became members of the Nopco 15-Year Club. The new members, who were given gold service pins by Board Chairman Charles P. Gulick, bring the total club membership to 155. At the same ceremony, several employees were given gold watches in token of 25 years service, and Dr. Charles I. Post, assistant vice president, received a jet crystal desk set for the same anniversary.

AT AN UNDISCLOSED purchase price, Wyandotte Chemicals Corp., Wyandotte, Mich., has acquired the Los Angeles plant of American-Marietta Co., Chicago. Pacific Chemical's plant and sales personnel are being absorbed by Wyandotte's Pacific Division, and Wyandotte research and technical service staffs are now available to clients of both companies.

A NEW DISTRICT SALES OFFICE has been opened by Pennsylvania Salt Manufacturing Co., Philadelphia, at Detroit. Heading the new district offices will be Harry G. Potts, district sales manager of the firm's heavy chemicals department; Mr. Potts will be assisted by W. B. Adam and Willis J. Stoddard.

STOCKHOLDERS of Allis-Chalmers Manufacturing Co., Milwaukee, recently elected Walter Geist to his ninth term as president of the company, and reelected all other officers and directors.

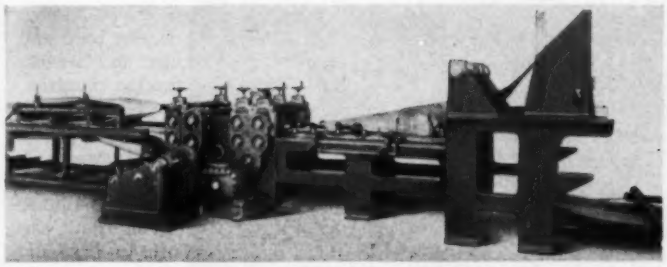
THE SMITH & WINCHESTER MFG. CO.

PAPER MILL AND PAPER BAG MACHINERY

Plant and Offices

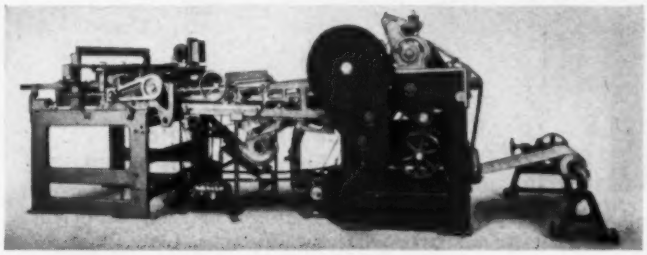
South Windham, Conn.

Modern, efficient machines for high-speed operation, large volume production and lower unit costs in the manufacture of paper and paper bags. Smith & Winchester equipment is custom-built to your specific requirements.



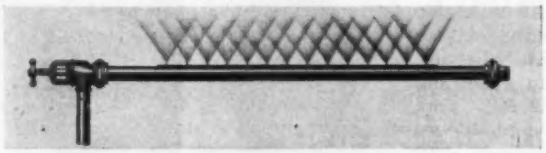
MULTI-WALL TUBER

For the production of single and multi-wall valve notch tubes for sewed valve type bags. Machine built in 2 sizes, 20" and 26" face; tubes, 26" to 50" long.



ROTARY SPOT CUTTER

Rotary Cutters for accurately handling large quantities of stock in finishing room. When equipped with patented photo-electric compensator, will accurately spot-cut pre-printed traveling webs. Built in 40", 50", 60", 71" and 83" widths. Layboy and stacker may be furnished.

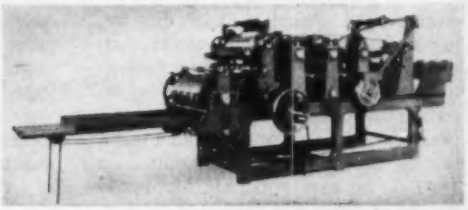


SHOWER PIPES

The famous S & W "Rainstorm" Shower Pipe for greatest effectiveness and maximum economy.

MODEL "E" UNDERCUT TRIMMER

The S & W Undercut is the only undercut trimmer made. The Model "E" is newly designed for fast, effortless, accurate cutting and safe operation. Retains the outstanding features of the S & W Standard Undercut with many new features added for greater safety, accuracy and flexibility. Built in 56", 66", 76", 86" and 96" widths.

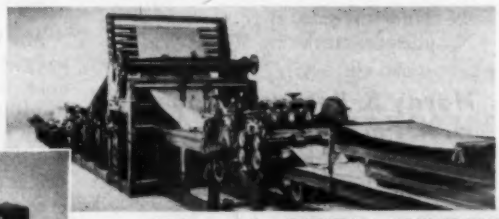


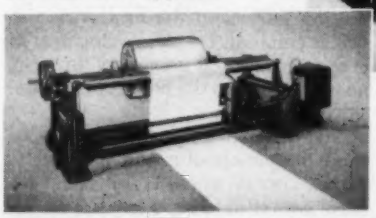
1/2 BBL BOTTOMER

S & W Bottomers are designed for high production and minimum spoilage with many new features for lowering bag production costs. Bottomers are made in several sizes. Produce standard satchel or narrow valve bottom.

WEB CONTROL

Fully automatic electric eye, side register control or web feed. Manual control can be supplied.





NO. 10 TYPE TUBER

For pasted bottom, multi-wall tubes. Used in connection with S & W Bottomers or producing standard satchel bottom or valve bag. Fully automatic or manual control for web feed.

Complete information on any of the above equipment on request.

SERVING THE PAPER AND PAPER BAG INDUSTRY SINCE 1828

The Paper Industry Names in the News

Faegre Becomes Pres. of M & O—Other Top Executives Changed

Several changes have been effected on the executive level at Minnesota and Ontario Paper Co., Minneapolis, upon the recent death of Donald D. Davis, former president (see Necrology).

A former director and member of Mando's executive committee since 1941, J. B. Faegre, has been elected president of the firm. Mr. Faegre, senior partner in the Minneapolis law firm of Faegre & Benson, will continue his legal practice as well as his directorships in other organizations including Minnesota and Ontario and Ontario-Minnesota Pulp and Paper Co., Ltd.

J. B. Faegre

C. T. McMurray

C. T. McMurray, newly elected executive vice president and director, joined Mando in 1918 as assistant purchasing agent, and has held increasingly responsible positions with the organization since that time, becoming vice president in charge of sales and a member of the Operating Committee in 1941. In his new work, Mr. McMurray will be in direct supervision of all company sales and operations.

Appointments announced by Mr. McMurray include the promotion of J. B. Norman as general manager of the National Pole and Treating Division, succeeding G. H. Ramsey, who is ill. Formerly director of purchases, Mr. Norman is succeeded by K. F. Speelman, stores supervisor of the company's International Falls, Minn., Division.

Other personnel changes announced at the same time for Mando's Canadian subsidiary, Ontario-Minnesota Pulp and Paper Co. Ltd., include the promotion of J. F. MacKellar, former resident manager of the Fort Frances, Ont., Division, to the post of vice president and general manager; and E. E. Crandall, formerly Kenora, Ont., plant manager, to resident manager of the Kenora Division. S. C. Stratton, formerly vice president and resident manager at Kenora, has been transferred to International Falls as assistant chief engineer; and D. D. McRae, assistant secretary treasurer of the Canadian subsidiary, has been transferred from Kenora to Fort Frances.

J. B. Norman

E. M. Root

Ned Root Promoted by Black-Clawson Co.

Former sales manager of the Dilts division of Black-Clawson Co., E. M. (Ned) Root, has been promoted to manager of the company's southern sales department. Operating headquarters will be established at a location convenient to the heart of the southern pulp, paper and converting industry.

Mr. Root, a graduate of the Pulp and Paper Department of the New York State College of Forestry, became associated with Black-Clawson in a research capacity in 1937, after working as a chemist with St. Regis Paper Co., was promoted to the sales department in 1939, and made sales manager of the Dilts division after service as a Navy lieutenant during World War II.

Hardy S. Ferguson Joins H. K. Ferguson Co.

After terminating his own engineering concern, Hardy S. Ferguson has joined the Pulp and Paper Engineering Division of H. K. Ferguson Co., Cleveland, as a designer. Several of the principal engineers in Mr. Ferguson's former organization have also joined the H. K. Ferguson firm.

Operating as Hardy S. Ferguson, Engineers, Mr. Ferguson directed design for some of the largest pulp and paper mills in this country and Canada, as well as in several foreign countries. Among his clients were Great Northern Paper Co., Sound View Pulp Co., St. Regis Paper Co., Farnsworth & Whitney Co., and Crossett Lumber Co.

In recognition of his contribution to the industry, Mr. Ferguson was awarded the seventeenth TAPPI Gold Medal by the Technical Association of the Pulp and Paper Industry.

Also active in the paper industry for many years, the H. K. Ferguson firm is presently engaged in expansion programs for Gulf States Paper Corp. at Tuscaloosa, Ala., and Calcasieu Paper Co., Elizabeth, La.

Whittum & Schnuck In Engineering Posts At Farrel-Birmingham

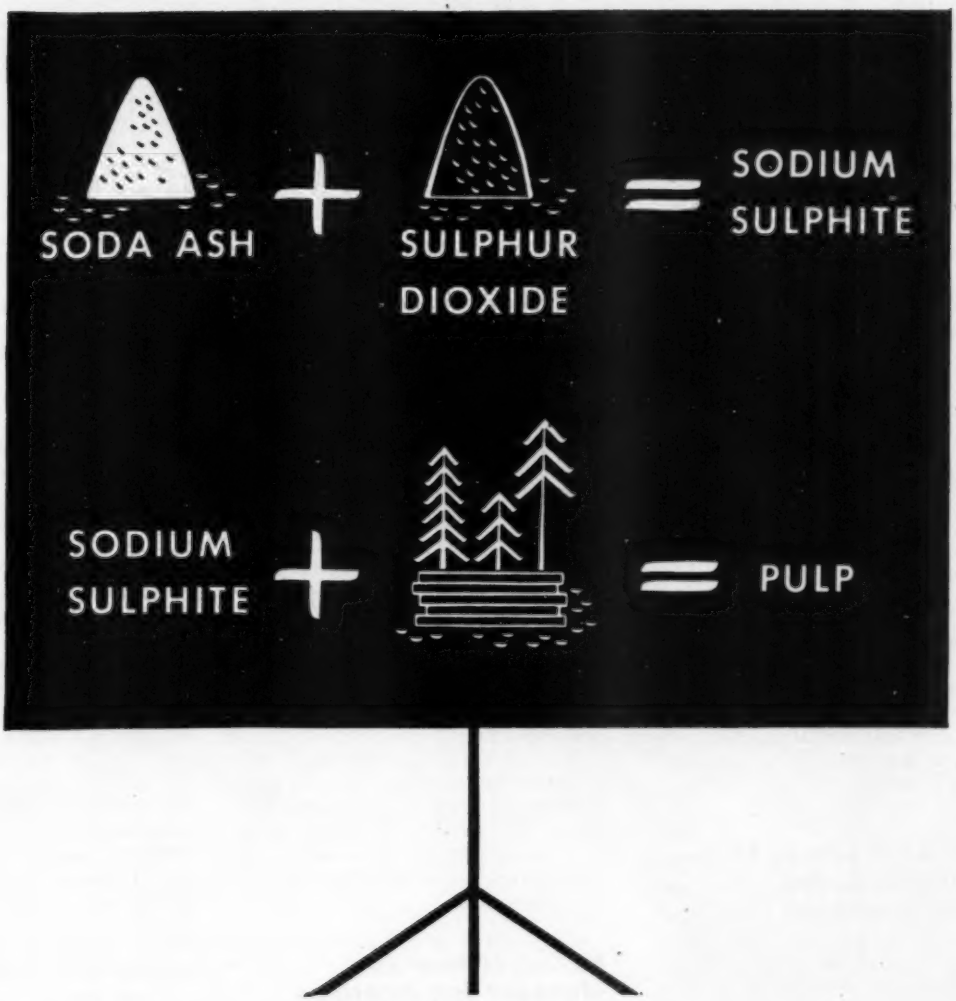
Two appointments in the engineering department of Farrel-Birmingham Co., Inc., Ansonia, Conn., have been made. Carl F. Schnuck, whose attainment of 50 years service with the firm is reported elsewhere in this magazine, was named director of engineering. New chief engineer is Warren C. Whittum.

Warren C. Whittum

C. F. Schnuck

Mr. Schnuck first came to the company in 1899, and has worked in every field covered by Farrel-Birmingham. In his new work Mr. Schnuck will have more time to guide the over-all engineering policies of the firm, with particular emphasis on the development of new and improved machinery. In 1945, he was elected to the board and became chief engineer.

The direction of engineering operations and personnel is now the work of Mr. Whittum, whose entire career has been with F-B. He entered the company's employ in 1930, shortly after



How costly is YOUR sulphite liquor?

Wyandotte Technical Service has made an extensive study of the costs of producing sodium sulphite. As a result, some pulp and paper makers produce their own sodium sulphite cheaper than they can buy it.

They buy sulphur and soda ash in bulk. They fit the manufacture of the sulphite liquor right into their own processes. They find it pays.

Will it pay for you? We don't know. But we'll be glad to help you investigate. Why not get in touch with the Wyandotte office nearest you? Or you can write to us direct.

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA
CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE
HYDROGEN • DRY ICE • SYNTHETIC DETERGENTS • GLYCOLS
CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE • PROPYLENE
DICHLORIDE • AROMATIC SULFONIC ACID DERIVATIVES
OTHER ORGANIC AND INORGANIC CHEMICALS

WYANDOTTE CHEMICALS CORPORATION
WYANDOTTE, MICHIGAN • *OFFICES IN PRINCIPAL CITIES*

Wyandotte

his graduation from Worcester Polytechnic Institute, and has since worked in many departments of the company.

Paper Makers Chemical Transfers Five Men

New assignments have been given to five members of the Hercules Powder Co.Paper Makers Chemical Department by the Wilmington, Del., firm. With headquarters at the firm's Kalamazoo, Mich., plant, J. W. Burke will henceforth be concerned with technical sales work.

So that he may assume charge of the technical service laboratory at Kalamazoo, as well as the responsibilities of training technical service personnel, Henry Heller will be transferred there. Kalamazoo also will be the headquarters of Fred L. Schucker, now assigned to the technical service staff.

J. Huston McClane has been transferred to the Atlanta office of the department, where he will be engaged in paper mill technical sales.

Charles H. Chapman has been transferred from the department's Portland, Ore., office to San Francisco, where he will also be engaged in paper mill technical sales work.

Zellerbach Leaves ECA—Returns to Duties of C-Z President

So that he may return to private business in San Francisco, James D. Zellerbach has resigned as ECA administrator in Italy. Mr. Zellerbach, who has been on leave of absence from his duties as president of Crown-Zellerbach Corp. since July, 1948, will be succeeded in the ECA post by his deputy, Leon Dayton.

Mr. Zellerbach's guidance of the Marshall Plan in Italy has been such a distinguished achievement that the University of California Alumni Association recently named him "Alumnus of the Year," in recognition of his winning "important campaigns in the cold war."

G-E Promotion For Paul F. Preston

Paul F. Preston, former manufacturing and engineering manager of the Chemicals Division of the Chemicals Department of General Electric, Pittsfield, Mass., has been appointed manufacturing manager of the Chemical Department.

Mr. Preston, a graduate of Lehigh University, went to General Electric in 1949, after engineering positions with DuPont and Allied Chemical & Dye Corp. In his new work, Mr. Preston will have staff responsibility for all manufacturing activities within the Chemical Department plants at Schenectady and Waterford, N.Y.; Anaheim, Cal.; Pittsfield, Springfield, and Taunton, Mass.; Dectaur, Ill., and Coshocton, Ohio.

John D. Dickson, Jr., Named Sales Engineer For Stowe-Woodward

Upon completion of a training course at the factory of Stowe-Woodward, Inc., Newton Upper Falls, Mass., John D. Dickson, Jr., will assume the duties of sales engineer for the company in the Michigan - Wisconsin - Minnesota territory. Mr. Dickson, a graduate of the University of Maine, had long been associated with R. T. Vanderbilt Co.

John D. Dickson, Jr.

Mr. Dickson succeeds Roy W. Holden, who has represented the firm in that territory for the past twenty-one years. Mr. Holden is retiring from active service because of ill health, but will continue in a consulting capacity for a short time.

McCall Is New Adv. Manager for American Lbr. and Treating Co.

The former assistant advertising manager of American Lumber & Treating Co., Chicago, J. E. L. McCall, has been appointed advertising manager of the firm.

Mr. McCall, who spent two years in the advertising and sales promotion divisions of General Electric Co., Schenectady, N.Y., before going to American Lumber in 1948, will be responsible for the advertising campaigns of "Wolmanized" pressure-treated lumber and for the sales promotion programs of the company's regional offices at Los Angeles, San Francisco, Portland, Jacksonville, Baltimore, New York, Boston, Little Rock, and Chicago.

New Board Members For Baker-Raulang

Three elections were recently effected by the board of directors of The Baker-Raulang Co., Cleveland. H. Dudley Swim, board member, was made chairman of the board; Clarence M. Taylor was elected chairman of the executive committee; and John R. Morrill was made vice president in charge of sales. The new officers assumed their new duties July 1.

Mr. Swim, who became a member of the board in 1948, will continue to enlarge his interests in the transportation industry. Mr. Taylor, who formerly was executive vice president of a large manufacturer of electrical equipment, also holds board membership in several allied corporations. Mr. Morrill is well known in the engineering field for his articles on welding, among which is the "Procedure Handbook of Arc Welding."

Personnel Changes At Yarnall-Waring

Numerous personnel changes have been effected at Yarnall-Waring Co., Philadelphia, in the past few months. Additions and transfers in district sales representatives include the appointment of Lytton C. Musselman to manage the Los Angeles district at the company offices in Huntington Park, California; Wallace C. Agren as sales engineer in the Chicago branch, to fill the vacancy left with the recent death of F. C. Harry Vaughan; R. W. Westlake as a sales engineer in the Cleveland branch, replacing Charles H. Grosjean who has returned to the New York territory; and the appointment of Lyle G. Chase, Jr., to the sales engineering staff of the New York district office.

In addition to the appointments made to these territories, Yarnall-Waring has chosen Power Engineering Co. its general sales representative in Salt Lake City.

Hercules Powder Co. Personnel Shifts—Jenkins & Steeper

Two personnel changes have been made in the Cellulose Produces Department of Hercules Powder Co., Wilmington, Del. Robert E. Steeper will leave the Hopewell, Va., plant to go to Wilmington, where he will work on sales development of new cellulose products. Harold Jenkins will leave the Hercules Experiment Station to join the Cellulose Products development group.

Mr. Steeper went to Hercules after receiving his bachelor's degree from the University of Kansas in 1942. Before his assignment to the Hopewell plant in 1942, he worked on government projects for Hercules.

After receiving two degrees from the University of Tennessee, Mr. Jenkins joined Hercules in 1947, and has been working in the Naval Stores Division at the Experiment Station.

"Four colors, both sides...rush!"

Paper Salesman: Don't let those specifications get you down. Quote a price to get the order.

Printer: Says you! And fall down on the delivery.

Paper Salesman: Not with this sheet. Fine finish front and back—close register for your cuts—inks will dry fast for work-and-turn press work.

Printer: This job goes to low bidder. We can't pay fancy prices for the stock.

Paper Salesman: There's nothing fancy about the price of this paper. The mill that makes it uses Hamilton Felts on all three presses of the paper machine. Finishes both sides alike and runs so fast that the increased tonnage brings costs to an all-time low.

• From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

Hamilton Felts

• Established 1858 •

E. G. Ingalls Now General Supt. St. John Sulphite, Ltd.

The position of general superintendent of St. John Sulphite, Ltd., Fairville, N.B., was recently accepted by Eugene G. Ingalls. Mr. Ingalls began his papermaking career at Brown Co. in 1934, where he remained until he joined Wausau Paper Mills Co., Brokaw, Wis., in 1944.

Mr. Ingalls first work at Brown was that of head of a bleach unit; when he left the firm he was in charge of the pulp section of the Research and Development Department. His first work at the Wausau mill, that of sulphite superintendent, led in 1948 to the position of vice president and manager of the firm, a position he retained until he left the firm a few months ago.

Charles E. Whitten Elected President Gair Co., Canada

The former vice president and treasurer of Gair Co. Canada Ltd., Toronto, Charles E. Whitten, was elected president and general manager of the company at a recent board meeting. Mr. Whitten succeeds George W. Brown, who passed away June 1. Mr. Whitten has been associated with the firm since its inception.

At the same elections, W. Russell Eccles, formerly assistant treasurer, was appointed treasurer, and Harold L. Steele was elected to the board of directors to fill the vacancy left by Mr. Brown's death.

E. D. Powers Elected V. P. of American Cyanamid Co.

Recent elections at American Cyanamid Co., New York, made E. D. Powers, former production manager, vice president in general charge of all matters concerning plant operations.

Mr. Powers first went to American Cyanamid in 1918, and has since served in many divisions of the company. From 1923 until 1940 he served as plant engineer of the Niagara Falls, Ont., branch, with a two year absence to supervise construction of a cyanide plant in South Africa. In 1940 he was appointed plant manager of the company's Welland, Ont., plant, where he remained until 1946.

F-M Announcements

Three personnel changes on the executive level have been made at Fairbanks, Morse & Co., Chicago. Upon the retirement of Lee Madden, Gorden R. Anderson, former manager of engineering at the Beloit works, has been appointed general manager of the Freeport works, Freeport, Ill.

Assuming Mr. Anderson's previous duties at the Beloit works is J. F. Weiffenbach, previously chief engineer of the firm's diesel Locomotive Division. Mr. Weiffenbach will retain his Beloit headquarters.

Concurrently, Donald L. Harwood was appointed purchasing agent of the company. Mr. Harwood, whose entire career has been with Fairbanks Morse, first joined the firm in 1926, and since that time has held positions of increasing importance.

New Worthington Post Filled by Wm. Meiter

The newly-created position of central sales manager of Worthington Pump and Machinery Corp., Harrison, N.J., has been filled with the appointment of a long-time employee, William A. Meiter. Mr. Meiter, who came to Worthington in 1927 immediately following his graduation from Ohio State University, first worked as a sales engineer, and in 1938 was named manager of the Buffalo office.

As central sales manager, Mr. Meiter will be responsible for the direction of sales from the Buffalo, Detroit, Cleveland, Cincinnati and Pittsburgh offices, and will make his headquarters in Detroit. Mr. Meiter's successor as manager of the Buffalo district sales office is John W. Stovall, who has been with the company 21 years, serving the firm as a sales engineer most of that time.

B. C. Brown, groundwood department superintendent at the Dalhousie N.B., mill of New Brunswick International Paper Co., has been transferred to the Three Rivers, Que., mill of Canadian International Paper Co. Mr. Brown, who has been at the Dalhousie mill for the past 13 years, previously was for 14 years groundwood superintendent at Three Rivers.

R. E. Baker has been appointed executive assistant to the general manager of Arborite Co., Ltd. but will retain his former position as secretary-treasurer of the firm. In his new work Mr. Baker will co-ordinate company plans relating to sales and advertising allowing General Manager D. S. Abbott to devote more time to Arborite's current expansion program. Previous to his appointment as secretary-treasurer in 1947 Mr. Baker had for eleven years been a member of Arborite's parent company, Howard Smith Paper Co., Montreal.

H. L. MacElroy has been appointed manager of the Chicago office of Springfield Boiler Co., Springfield, Ill., at 612 No. Michigan Ave. Additionally, Mr. MacElroy, who has some twenty years experience in the steam generating and fuel burning fields, will serve as factory sales representative for the firm in the Chicago area.

Hamilton Merrill, vice president and director of Manning, Maxwell & Moore, Inc., Bridgeport, Conn., has been appointed vice president in charge of the Consolidated-Ashcroft-Hancock Division of the firm. A graduate of Massachusetts Institute of Technology, Mr. Merrill has been associated with Manning, Maxwell & Moore for thirty years.

Robert D. Handley, advertising manager of the Sylvania Division of American Viscose Corp., New York, has been elected chairman of the Exhibitors' Advisory Committee of the 20th National Packaging Exposition, to be held in Atlantic City, N. J., April 17-20, 1951. Mr. Handley will be in charge of all arrangements for the Exposition.

Rae L. Johnson, for the past seven years chief engineer of the Woods Division of Columbia Cellulose Co. Ltd., Canadian subsidiary of Celanese Corporation of America, has been named manager of that division. The Woods Division is responsible for the development and operation of the firm's Port Edward Management License, under which the wood supply for the company dissolving pulp mill near Prince Rupert, B. C., will be provided.

James P. Buchanan has been elected a director and treasurer of Northern Paper Mills, filling a vacancy occasioned by the death of Henry W. Tuttrup. Since coming to Northern in 1947, Mr. Buchanan had served as Mr. Tuttrup's assistant. New secretary of the company is *C. A. Pertain,* elected to fill the vacancy left with the resignation of William E. Buchanan from the position.

E. R. Eden has resigned as office manager of Dexter Sulphite Pulp and Paper Co., and *Thomas Saxon* has been appointed to the position. Mr. Eden, who has held the position since 1948, had been associated with the Dexter firm since 1946. He left Dexter to devote his full time to a private business enterprise.

The Rice Barton DynoPulper

—completes treatment of paper stock in one machine

Other DynoMachines:

- The **QuatroPulper** is designed for processing stock in large capacities . . . either batch or continuous operation.
- The **DynoChest** is primarily for disintegrating stock in slush form . . . batch operation.
- The **Dynofiner** is for performing the same operation on a continuous basis.

The DynoPulper is a highly efficient machine for processing any type of pulp or waste paper . . . completing the stock treatment in one operation.

The DynoPulper employs two opposed DynoPellers (described below) which rapidly and economically reduce the stock to slush form . . . then continue the operation to completely separate the individual fibres one from the other. There is no appreciable drop in freeness and no cutting or shortening the original fibre.

The fibre characteristics of the stock can be developed further by giving it additional time in the DynoPulper . . . eliminating the need for beating on many grades of paper.

RBR-9

The DynoPeller

is the heart of all DynoMachines. Its concave face is lined with rough, hard carbide particles. As the DynoPeller rotates it causes a suction at its center that pulls the stock towards it. Centrifugal force then causes the stock to flow rapidly over the rough carbide particles. This effective dynomizing action completely disintegrates the stock . . . separating each fibre from its neighbor while maintaining its original length.

Write for complete information.

RICE BARTON *Research Corporation*

WORCESTER 1, MASS.

William Greeley, treasurer of F. C. Huyck & Sons, Albany, N. Y., was elected a vice president of the firm at a board meeting in which *Roderick T. Clarke,* secretary, was elected secretary-treasurer, and *Charles W. LaDow* was named assistant secretary-assistant treasurer.

James C. Handy, associated with the carton and paper products industries for the past 28 years, has been appointed to the sales staff of Gardner Board and Carton Co., Middletown, Ohio. Mr. Handy, who will have his headquarters in Middletown, will serve paraffine carton customers in the Ohio and Indiana territories.

Charles E. Kaufman, former assistant director of research for Hall Laboratories, Inc., Pittsburgh, has been named director of research. Mr. Kaufman, who has been with the Hall firm since his graduation from the University of Cincinnati in 1936, succeeds Dr. Everett P. Partridge, who was recently named director of Hall Laboratories.

Roland W. Burt, associated with Joseph T. Ryerson & Son, Inc., since 1923, has been appointed sales manager of the Chicago plant of the company. Mr. Burt succeeds *Thomas Z. Hayward,* former assistant general manager of sales and acting sales manager, who has been promoted to general manager of sales.

Douglas E. Newton, associated with Denver Equipment Co., Denver, for the past 11 years, has been appointed company general sales manager. Mr. Newton has worked in several departments of the company, and for the past two years was in charge of the firm's manufacturing plant in Colorado Springs, Colo.

A. E. Campbell, associated with the instrument industry for many years, has been appointed sales manager of Clapp Instrument Co., Webster, Mass.

James G. Willis has been appointed Pacific district manager for Harris-Seybold Co., Cleveland. Mr. Willis, who joined Harris-Seybold in 1945 as manager of the Twin Cities Office, has served at midwestern branch manager at St. Louis for the past year. *William Guy Martin,* vice president, will continue his work on the Pacific Coast, and will now be able to devote more attention to creative counseling for West Coast customers.

Herbert L. Wagner has been promoted from his former position as chief engineer of Detroit Stoker Co., Monroe, Mich., to that of vice president in charge of engineering. Mr. Wagner will continue to be located at the Detroit offices of the firm.

Norman H. Collisson has been elected vice president of Ecusta Paper Corp., Pisgah Forest, N.C.

Ray Johnson, formerly logging engineer for Weyerhaeuser Timber Co. at Longview, Wash., has become logging manager for the Celanese Corp. of Canada at Prince Rupert, B.C.

S. A. Salmonson has been appointed exclusive Pacific Coast representative of Chemical Linings, Inc., Watertown, N.Y. Mr. Salmonson will be located at 907 Terminal Sales Building, Portland, Ore.

Herbert L. Wagner, formerly chief engineer at the Detroit office of Detroit Stoker Co., Monroe, Mich., has been promoted to vice president in charge of engineering. Mr. Wagner will continue to maintain offices in Detroit.

Kenneth Bassett, associated with Dodge Manufacturing Corp., Mishawaka, Ind., for the past 23 years, has been appointed supervisor of sales promotion for the company.

James D. Evans, formerly an account executive with Young & Rubicam, Inc., has been appointed advertising manager of Diamond Match Co., New York. Mr. Evans will make his headquarters at Diamond's general offices at 122 East 42nd St., New York.

Lester F. Herman has severed his connection with Fulton Iron Works, St. Louis, and has become associated with the Gruendler Crusher and Pulverizer Co. of St. Louis.

Charles L. Haslup was recently appointed sales manager of the R-P & C Division of American Chain & Cable Co., Inc., with headquarters at Reading, Pa.

J. Lawrence Kennedy has been elected vice president and secretary of The Kennedy Valve Manufacturing Co., Elmira, N.Y., and to the board of directors of the firm.

The Paper Industry Necrology

Howard Estep Atterbury

Former manager of L'Americana, one of the first Argentine paper mills, Howard Estep Atterbury, passed away May 30 at his estate near St. Margareta, Md. He was 74 years of age.

Mr. Atterbury, who went to South America for International Paper Co., returned to the United States in 1910 to join his father in the New York paper company of Atterbury Brothers, Inc. He left the paper industry to serve as a major in World War I, later becoming chairman of the Seward National Bank of New York, which was later amalgamated with the Bank of Manhattan.

A son, Gerald Atterbury, survives.

Russell C. Tilden

Funeral services for Russell C. Tilden, sales manager of the unbleached kraft paper division of International Paper Co., New York, were held June 9. Mr. Tilden had been associated with International since 1899, when he joined the company as a bookkeeper. In 1903 he was transferred to the Sales Department of the firm.

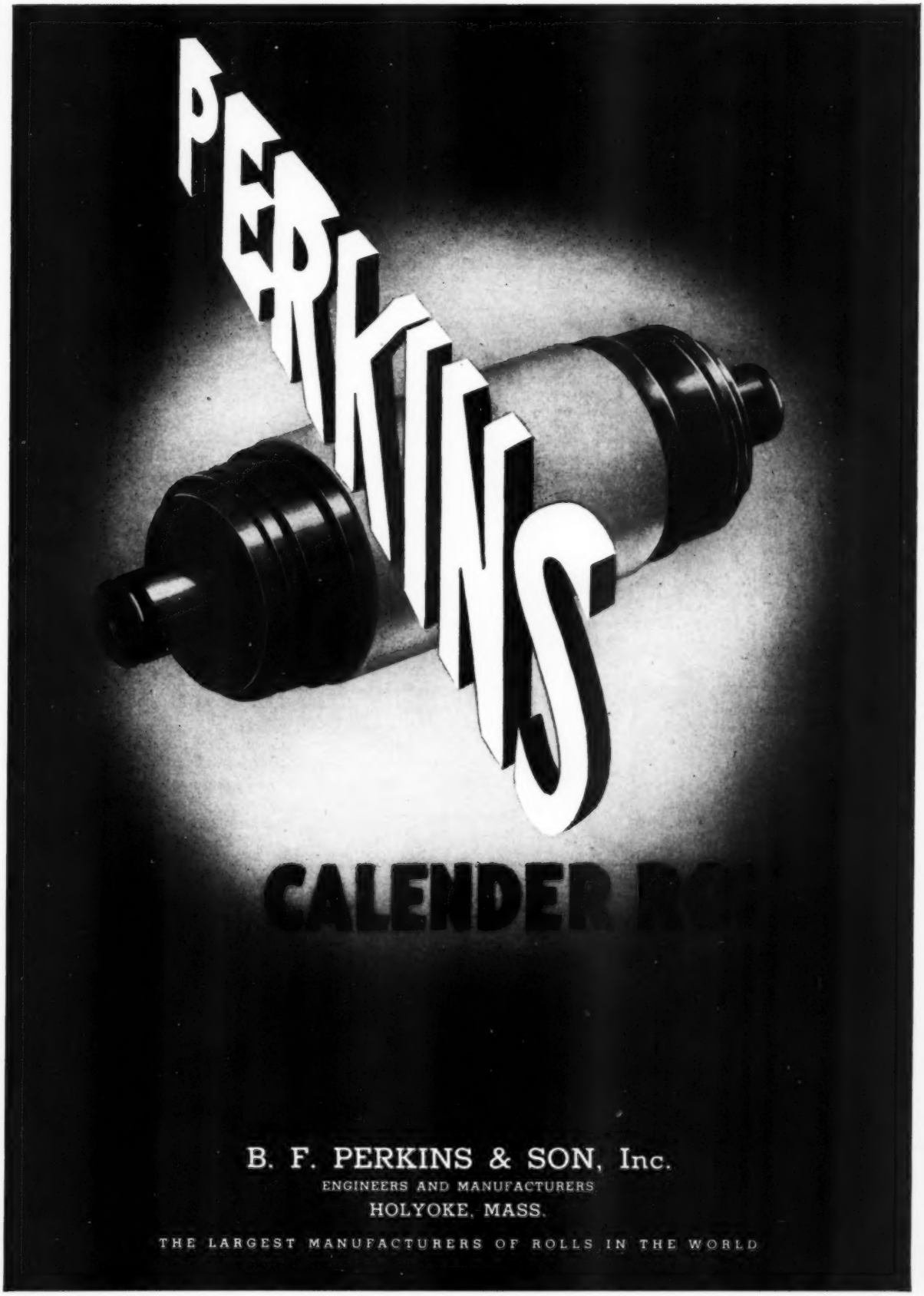
When International acquired the Bastrop, La., mill in 1928, its first paper mill in the South, Mr. Tilden was placed in charge of the sale of kraft paper and remained in that field until his death. He was perhaps most widely known in the wrapping paper field.

The widow survives.

Donald D. Davis

The president of Minnesota and Ontario Paper Co., Minneapolis, Donald D. Davis, passed away June 7. He was 61 years of age.

Mr. Davis was a graduate of the University of Michigan. After holding several positions in the engineering field, he became a vice president of General Mills upon its formation in 1928, and was elected president of the firm in 1934. He resigned that position in


PERKINS
CALENDER
B. F. PERKINS & SON, Inc.
ENGINEERS AND MANUFACTURERS
HOLYOKE, MASS.
THE LARGEST MANUFACTURERS OF ROLLS IN THE WORLD

1942 to become vice chairman of the War Production Board. In 1944 he became executive vice president of Mando, and in 1945 was elected president of the firm.

Mr. Davis was widely known locally for his participation in philanthropies; he also was affiliated with a number of national and industrial bodies.

George W. Brown

The president and general manager of Gair Co., Canada, Ltd., George W. Brown, passed away June 1 at Toronto. Mr. Brown, who attained his last position in 1930, had been with the Gair company and its predecessors since 1926. He also served on the executive committee of the Canadian Pulp and Paper Co.

The widow and four daughters survive.

R. E. S. van Nydeck

While on vacation, Raymond E. Schenck van Nydeck, of New York City, passed away suddenly in French Lick, Ind. He was 63 years of age.

For a number of years, Mr. van Nydeck had been associated with advertising in New York City. Since November, 1945, he had been advertising representative in the New York City area for Fritz Publications, Inc.

Surviving are the widow and a daughter, also his father whom he had been visiting just before he was stricken.

William P. Yanes, an official in the Boston Paper Board Co., Boston, passed away recently at Newton, Mass., at the age of 59. Mr. Yanes had been associated with the Boston firm for 28 years.

George A. Arbogast, traveling representative for Ecusta Paper Corp., Pisgah Forest, N.C., passed away recently at Fletcher, N.C. Mr. Arbogast, who was 60 years old, was at one time associated with American Machine and Foundry Co., Brooklyn, N.Y., and later served as president of Universal Leaf Tobacco Co. of China.

John W. Gibson, former purchasing agent and office manager of West Virginia Pulp and Paper Co., Mechanicville, N.Y., passed away in his home in that city May 9. His widow survives.

General Thomas Stevens Hammond, chairman of the board of Whiting Corp., Harvey, Ill., passed away in Chicago June 15, at the age of 67. The widow and two sons survive.

The Paper Industry Safety News

Drink to Safety!

The seven-ounce cold drink cups manufactured by Dixie Cup Co., Easton, Pa., for use in vending machines are now available in a new series of safety designs.

Dixie safety designs, which have been available for six-ounce hot drink vending machine cups, tie in with the safety campaign of the National Safety Council by incorporating the Green Cross emblem and "Safety Green" color of the council with bold illustrations, safety slogans, and the Dixie design.

The cold drink series, comprising five different designs nested in consecutive order, covers a wide variety of safety problems occurring at work, in the home, and on the highway. Designs are general enough that they may be used in theatres, sports arenas, and other places of amusement, as well as for industrial purposes.

THREE AWARDS for outstanding achievement in industrial safety during 1949 were made June 28 to St. Regis Paper Co.'s multiwall paper bag plant at Nazareth, Pa. The Nazareth plant attained an NSC frequency rating of 4.17 as compared to the paper converting industry average of 15.13. The plant not only had the best safety record in the company's Multiwall Bag Division, but was at the top of all 34 St. Regis operating units.

102 Perfect Scores Recorded at End of Fourth Month

The fourth month of the Paper Industry Safety Contest recorded a decrease of 2 per cent, bringing the rate down to 9.55 from 9.78 for the previous month. This reduction was effected by the efforts of contestants in Division II, which was reflected by a 21 per cent reduction in the Division's average rate.

By comparison, the three-month cumulative rate showed little change over last month's three-month rate. The average rate for each group is lower this year than last year. The per cent decrease in rates, compared with the rates for the previous contest, range from 4 to 26 per cent. The average rate for all contestants, comparing the two periods, was down 12 per cent.

The following summary shows 102 mills in the contest completing the month of April with a perfect record:

Division I—Paper and Pulp Mills

Group A	2
Group B	6
Group C	13
Group D	42

Division II—Paper Converting

Group A	2
Group B	8
Group C	29

MEETING PLACES FOR sessions of the 38th National Safety Congress and Exposition, to be held Oct. 16-20 in Chicago, have been chosen. Sessions on industrial safety will be held at the Stevens, Congress and Morrison hotels; traffic safety discussions will convene at the Congress hotel; commercial vehicle, farm and home safety meetings will be at the LaSalle hotel; and school sessions will be conducted at the Morrison. R. L. Forney, general secretary, National Safety Council, 425 No. Michigan Ave., Chicago, can supply further information.

FREE

From Western Precipitation—the organization that pioneered the commercial application of Cottrell Precipitation...

IF YOU ARE ENGAGED in any phase of industry where the recovery of dusts, fumes, fly ash, mists, fogs or other suspensions from gases is a problem, you will find this booklet on the COTTRELL Electrical Precipitator helpful and informative.

Western Precipitation pioneered and installed the first commercial application of the well-known COTTRELL Electric Precipitator—Dr. Cottrell, the inventor, being a member of the company. And for more than 42 years Western Precipitation has consistently led in developing new COTTRELL advancements and techniques for recovering suspensions from gases, both wet and dry.

This 28 page booklet summarizes many of the basic facts you should know about modern COTTRELL Precipitators—the various types available, how they operate, principal types of electrode systems and rectifiers, shell constructions, etc. As long as the supply lasts, a free copy will be sent you on request to our nearest office. Ask for Bulletin No. C 103.

28 PAGES
of helpful facts to know about
COTTRELL ELECTRICAL PRECIPITATORS

Packed with helpful COTTRELL Information!

This Western Precipitation Cottrell booklet is designed to answer questions of design engineers, plant engineers and others interested in applying Precipitators to the recovery of industrial dusts and mists. It discusses such subjects as...

- Basic types of Cottrell Electric Precipitators.
- Principal parts of a Cottrell Precipitator.
- Mechanical and Electronic Rectifiers.
- Various types of Collecting Electrodes (rod curtains, corrugated plates, dual plates, pocket electrodes, etc.).
- Removal of Collected Material.
- Factors in Shell Construction (steel, concrete, brick, etc.).
- Operating Efficiencies and the Effect of Various Factors on Performance.

...and many other basic Cottrell facts. Write for your free copy of Bulletin C103 today while supplies are adequate!

Western Precipitation is not affiliated with any other company in the field of electrical precipitation except its wholly owned subsidiaries, International Precipitation Corporation and the Precipitation Company of Canada, Ltd. Whether you are now contemplating the installation of a Cottrell Electrical Precipitator, or may be interested in such an installation at a future date, we can and will serve you in any part of the United States or other countries.

NOW SELLING
COTTRELL Precipitators
MULTICLONE Collectors
TURBULAIRE Spray Dryers
in all parts of the U. S. A. and foreign countries.

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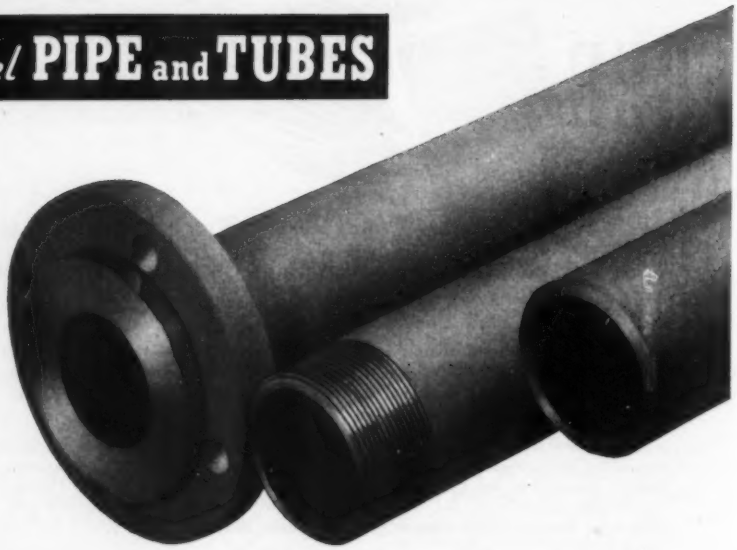
MISCO *Stainless Steel* PIPE and TUBES

MISCO Stainless Steel Pipe and Tubes are centrifugally cast from induction melted metal. Available in any commercial stainless steel analysis to suit requirements, they are produced in a wide range of sizes with wall thicknesses of 1/4" and up. We are pleased to recommend the preferred analysis to meet specific conditions. All Misco Stainless Steel Pipe is pressure tested hydraulically at 300 p.s.i. and offers dependable protection against most corrosive agents. We invite your inquiries on any project involving the use of stainless steel castings, pipe and tubes.



Centrifugally Cast Stainless Steel Pipe and Tubes
Large and Medium Weight Stainless Steel Castings
Centrifugal Castings

ALLOY CASTING DIVISION
Michigan Steel Casting Company
1999 GUOIN ST. · DETROIT 7, MICH.
MISCO Heat and Corrosion Resistant Alloys
One of the World's Pioneer Producers and Distributors of Heat and Corrosion Resisting Alloys

Hold Everything!

for every three workers injured on-the-job last year, four were hurt off-the-job

Cartoon-illustrated HOLD EVERYTHING is a sparkling little booklet that covers all these major traffic, pedestrian, and home accidents . . . and at a rock bottom cost. HOLD EVERYTHING costs only a few cents a copy.

HOLD EVERYTHING drives home a serious message . . . with a smile. Takes over where your plant program leaves off. This colorful off-the-job booklet speaks for you . . . with suggestions on swimming, sun-tanning, and just plain "car sense." There is a handy home check list to make those stay at home "vacations" a lot safer. Cut down vacation lost time by ordering copies for each of your workers. Send in your order, today.

QUANTITY PRICES	1 to 9	10 to 99	100 to 999	1000 or more
	$ .12	$ .10	$ .07	$ .055

Non-member prices same as member.

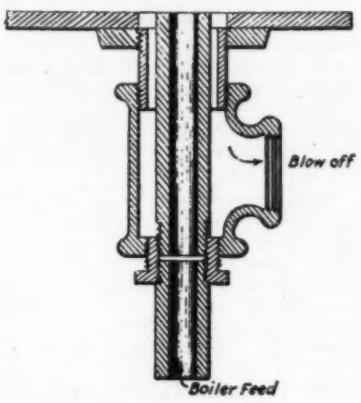
NATIONAL SAFETY COUNCIL
425 NORTH MICHIGAN AVENUE, CHICAGO 11, ILLINOIS

The Paper Industry Practical Shorts

Suggestion for a Boiler Feed Connection

A method that seems logical to this writer for feeding boilers is to feed them through the blow-off pipe about as indicated in the accompanying sketch.

Employing this method means only one opening into the boiler instead of two openings—one for each individually. In this way the feed pipe does not come into actual contact with the boiler shell, but is separated from it by a water jacket. The water



in this jacket has a temperature intermediate between the feed water temperature and the temperature of the boiler, because the feed water will keep it down. This tends to eliminate the stresses caused by cold feed coming in direct contact with the hot shell.

In addition this method protects the blow-off pipe against the high temperature to which it is often subjected and prevents burning. True, there are some objections to this method in that it does not prevent ALL stresses, and more scale is likely to be deposited near the blow-off than otherwise. But these objections are almost trivial as compared with the objections to direct entry of the feed pipe through the hot shell.

—W. F. SHAPHORST, M.E.

Keep a Careful Watch For . . .

EMPLOYEES WERE taking a paper sheet over the stack. It started to wad up under the doctor's blade. As an employee pulled on it to free it, his second and third right finger were jammed between the edge of the doctor blade and the wad of paper when the stack roll, which was turning, shifted the paper wad.

Use a stick for pushing wads out of doctors, if the mechanism will not open enough for proper clearance of wadded paper.

A COATING HELPER, while removing trim from under a cutter, was struck on the foot, (above the safety toe of his shoe) by a falling roll shaft. This shaft had been left unblocked, about eleven inches above the floor, suspended between the front and back base, and had become covered with trim. He sustained a fracture to the first metatarsal of his right foot, with contusion.

The shaft has been removed from the department and is not to be left in this position at any time when being used. Reinstruct employees never to leave a shaft, core, or roll unblocked. Inspect the machine before starting up for any hazard that might become covered with trim or broke.

A BAILER, while tying bales of pulp, sustained a wire puncture wound to his right middle finger. He reported to first aid the following day, but infection had already developed.

Report all injuries for first aid promptly.

A BEATER WORKER was wiping around a reduction gear and guard when his hand was pulled between the gear teeth. It happened so quickly that he didn't know just how his hands got into the gears, but the wiping rag was found under the gears. He sustained a multilation of his right hand, requiring amputation of three fingers and part of the thumb.

Don't wipe moving machinery. Shut it off first.

A WOODYARD laborer was shoveling bark onto a conveyor chain from the ground level. He climbed up on the conveyor framework to remove bark from under the chain. His foot slipped and was caught between the conveyor channel and the lug on the chain. He sustained a compound fracture of the left foot at the base of the great toe.

Either shut off a conveyor before attempting to remove bark from under the chain or use a stick for digging out.

—From the *News Letter*, published by Pulp and Paper Section of the National Safety Council.

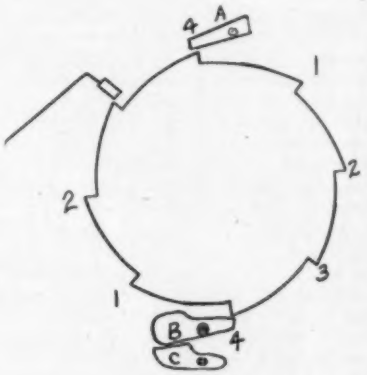
"Automatic Trip"—a Device that Won an Award

An ingenious grinding room device that has increased wood grinding production brought its designer a substantial cash award. The device speeds up the grinding process by reducing waiting time for retracting the grinding shoe and gate on the grinder pockets.

This "automatic trip" consists of a series of pivot arms and steel linkage, or rods, connected together. These are attached to each grinder cylinder. A follower rod is attached to a pressure piston. Upon completion of a grinding stoke, the collar trips a "forked" linkage which in turn transfers the motion through a series of pivot arms and linkages to a filler piece. This in turn drops against a ratchet wheel between a ratchet "tooth" and ratchet "dog" which is in motion at all times. This is the stage where the lost motion is eliminated.

The ratchet wheel actuates a four-position valve which rotates to open and close the grinder pocket.

The floor of the reserve pocket opens and



permits wood to drop automatically into the grinder pocket. The reserve floor immediately closes up. The ratchet "dog" advances the ratchet wheel controlling the four-position valve which directs water to the "pressure" side of the piston, returning the piston shoe to the grinding position. High pressure is then applied to the pressure side and grinding progresses. The cycle then is repeated.

Not only has installation of the automatic trip on grinder cylinders increased production, but since the installation records of the hydroelectric plant show an even flow of power.

Designer of the automatic trip device is *Henry Orstad*, mechanical foreman at the *Minnesota and Ontario Paper Co.* mills in International Falls, Minn., who received a cash award of $410, the largest ever paid at the International Falls division since Mando instituted the suggestion award system for employees in 1945.

Convention Papers . . . Abridged

Limitations of ink adjustments to paper*

F. A. WEYMOUTH
Plant Manager
International Printing Ink

It has long been recognized that when paper is at the press ready for printing the individuals then concerned with the immediate production of the job are the printers and ink manufacturer. It is of prime interest to both that, prior to this choice of paper, full facts have been considered in order that the job may proceed as scheduled and without difficulty.

Prior to the arrival of the paper at the printing press, someone had to make a choice of a particular paper to be printed. Sometimes the paper is purchased by the ultimate consumer, sometimes by the printer on the job, and sometimes the paper simply happens to be on hand. We inkmakers believe any major troubles and near catastrophies can be averted by careful initial planning.

Let us assume that paper is on the press and we must overcome any of several typical problems. We have chosen these examples to illustrate what can be done and the limitations with respect to ink adjustments.

Newsprint—As far as the inkmaker is concerned, two problems show up from time to time. The paper may run too non-absorbant and cause undue smutting. Compounding with thinner oils will alleviate the trouble, but there is a definite limit of thin oils that can be added since the existing strike-through will be increased in direct proportion to the thin oils added. If the paper is too rough, a flatter ink will yield a smoother print.

E. F. and Supers—The major problem is to print the screen tones open and the solids or type black. If the surface is rough when sufficient ink is carried, the middle tones fill. Usually the remedy is to make the ink duller. When super papers have a wild formation, or upon calendering become relatively non-ink receptive in some areas, it is difficult to make a good smooth laying glossy print. A hard smooth surface is desirable on roto super papers provided there is uniform ink receptivity.

Machine Coated—These are mainly printed on rotary type heat dried presses, with a smaller proportion on flat bed presses employing regular oxidizing oil inks. Ink problems encountered with these papers are mainly picking and printability. When incorrectly coated or the coating poorly bound, ink adjustments usually answer the problem. If the coating pick problem concerns a four-color trapping job, inks can be reduced in tack but almost always at a sacrifice in trapping resulting in a poorer reproduction of copy. If coating dusts out some assistance may be had by lubricating the ink with vehicle or greases. If screen tones are choked, duller inks often answer the problem.

Coated Papers—Typographic—At one time or another, the inkmaker is faced with problems of picking, insufficient gloss, poor ink lay, and binding. The problem of pick resistance of coated papers has been most difficult, and in our opinion, least understood. We illustrate in paragraphs to follow our suggestions for minimum pick resistance of coated two-side papers. We make these suggestions since the paper industry has not yet set up any standards for pick.

Many do not prefer pick test waxes because they give erratic results on thermoplastic coating binders. In the table follownig we correlate the Dennison wax readings on a "non" thermoplastic coating with the International Printing Ink series of tack graded inks. These inks are non-drying black inks with tack ratings from 1 through 7 with Inkometer readings of 7, 15, 20, 25, 30, 35, and 45, respectively.

A single color press can employ a less viscous ink than an ink on a two-color press since on a two-color press the first down ink must maintain sufficient "pull" to lift the second down and superimposing color well in order to insure a good trapping. In gloss ink printing the ink must lie on the paper surface. If we are forced to reduce the viscosity greatly, all the vehicle will sink into the sheet. The table illustrates how these factors affect our desired minimum pick resistance for coated two-side papers for typographic printing.

In the case of (A), where there are no solids or heavy type, if the pick test drops to 4 or even 3, there may be no press troubles. The usual Inkometer readings for halftone blacks are in the range of 7 to 10. Hence, our recommendation of tack-graded ink is 1 as a minimum. If there is picking trouble, the addition of a little reducer usually will take care of it.

In example (C), oft-times a large tint solid color is superimposed with type or halftones or solids. The average Inkometer reading of such first down inks is 12; our choice of tack-graded ink blending 25% of #1 and 75% of #2 is recommended.

Examples (B) and (D), which involve further limitations with respect to viscosities of ink common to best gloss ink, limit further the field of suitable papers and consequently make more narrow the limits of ink adjustments to maintain trapping and ink gloss.

Label Coated One Side—Similar comments can be made of typographic printing requirements for either regular or gloss ink printing. Labels, more often than not, are covered with heavy ink films and are usually printed with two or more wet trapped colors. We suggest that stock should pass a minimum of a #3 tack-graded ink, with an Inkometer reading of #20.

Offset Coated Papers—On the basis of average viscosities of normal bodied offset inks, we would suggest the stock pass a minimum of the #3 (20 Inkometer) tack-graded ink.

Picking Strengths of Papers—Past and Present—In 1938 the writer made a record of pick tests of all known coated typographic and offset papers produced at that time. A similar group of papers were checked again with Dennison waxes in 1946. It was expected that these tests would show a drop because of the paper raw material situation at the end of the war. Recent spot checks of similar papers show that the average resistance to picking remains about the same as it was during 1946.

Another adverse factor is the advent of many new printing and offset presses which either run faster or impose an added burden on the paper because they are multi-color presses. As far as we know, there is nothing new that will assist in making markedly lower viscosity inks for these new faster presses. It is a simple physical law that the "pull" of an ink on paper is increased directly with the speed at which paper leaves the inked plate.

Binding and Chalking—Once in a while paper stock will show up with an unusually rapid ink absorption. Often this excessively rapid absorption will drain the ink vehicle away from the pigment. This action, which leaves the pigment without a binder, is referred to as poor ink binding or chalking. It should not be confused with poor drying, which refers to a too slow oxidation or polymerization of the vehicle.

If the inkmaker is supplied with a sample of stock prior to the first run he will find the poor binding when he makes his color proof, and can usually then add binding varnishes such as gloss varnish to slow up the rate of vehicle penetration. If, however, stock is printed without special ink there is little that can be done beyond applying a transparent size or varnish at a subsequent printing.

Printability—Printability is equally, and often more, important than minimum picking requirements. Given two papers of different degrees of printability the best paper with its proper ink can never be matched by a poor printing paper employing highest quality ink.

Marked progress has been made in testing

(*) Abridged from a paper given before the 31st annual convention of the American Pulp and Paper Mill Superintendents Association, held at Chicago June 8-10, 1950.

TABLE—Pick Resistance Coated Two-Side Papers

Single Color Press	Dennison Wax	Tack-Graded Ink	Inkometer
(A)	5	1	7
(B) (1)	6	25% #1, 75% #2	12
(2)	7	#2	20
Two Color Press			
(C)	6	25% #1, 75% #2	12
(D)	7	3	20

(A) Halftone, few solids (B) Gloss Ink Forms (1) Light (2) Heavy
(C) Tint Blocks & Halftones (D) Gloss Ink—2 Heavy Forms

printability of paper with ink by a number of paper mills using empirical methods published in 1942 and used by some mills before that time; their papers are known throughout the Graphic Arts as being the best for printability. Board mills are also setting themselves up to obtain a running picture of the printing quality of board.

A number of paper mills, holding top positions in the industry, have been using printing testing methods on practically every roll and skid of paper made for several years. We are sure these mills would not do this extra work if it did not pay dividends. Similarly, in some of the major printing plants in the country we have seen the value of having laboratory people check the printability and picking strength of paper. In most instances, rolls of paper are spot-checked from a given car. Mutual standards have been agreed upon by mill and printer, giving the printer an excellent picture over a period of months as to how paper from a given mill is running.

Utilization of weather information by the pulp and paper industry *

JOHN M. PORTER
Meteorologist
U. S. Weather Bureau

Weather information can be used in many ways to benefit the paper and pulp industry. Weather information programs can best be divided into three main phases: the fire weather program, the transportation problem, and hydrology or water supply.

Fire weather program Fire weather forecasts are issued daily by the Weather Bureau to the U.S. Forest Service and the State Conservation Departments. These forecasts emphasize expected weather, winds, and humidity for the next 24-36 hours. On the basis of the burning index at the time and expected weather from the forecast, necessary preparations for forest protection can be made for the next day or two.

This burning index is a series of numbers derived by the forest service by actual tests in the field. Fires were started under various conditions, and observations made as to how fast they spread and build up under various weather conditions. The most important items affecting the beginning and spread of fires are weather, winds, humidity, number of days since the last rain and the amount of that rain, whether the vegetation is green, dead, or intermediate.

From such observations, a table of burning indices, running from 0-100, was set up as follows:

0-1, safe—Fires will not spread beyond the heat of a camp fire or burning brush pile. No men specifically needed for fire control.

2-3, very low—Fires will start from an open flame but spread slowly and tend to go out. Lookouts needed for areas of special danger.

4-6, low—Fires will start from a lighted match and spread until extinguished. Men needed on primary lookouts. Regular protection force on call.

7-12, moderate—Fires start readily from a match, burn briskly and tend to spread rapidly as they increase in size. Regular protection force available. Secondary force on call. Secondary lookouts needed if visibility is poor.

13-24, high—Fires start readily from a match or glowing cinders, spread rapidly and tend to crown in young growth. Regular and secondary protection forces should be ready for immediate action and reserve forces available.

25-49, very high—Fires will start from a cigarette butt or sparks, spread rapidly and tend to crown generally. Spot fires common. Men needed for emergency stations. Entire protection force needed. Volunteers and supplemental help may be needed.

50-100, extreme — Explosive conditions. Fires start readily from sparks, burn fiercely, crown and spot generally and are all but uncontrollable. Maximum effort for all concerned.

In addition to the weather factor, the risk that is present should be taken into account. That would refer mainly to the human element, such as campers, or such things as trains that run through the area. Also there is the fire hazard, the condition of such things as fuels in the forest. Risk, fire hazard and burning index comprise the fire

(*) Abridged from a paper given before the 31st annual convention of the American Pulp and Paper Mill Superintendents Association, held at the Edgewater Beach hotel in Chicago, June 8-10, 1950.

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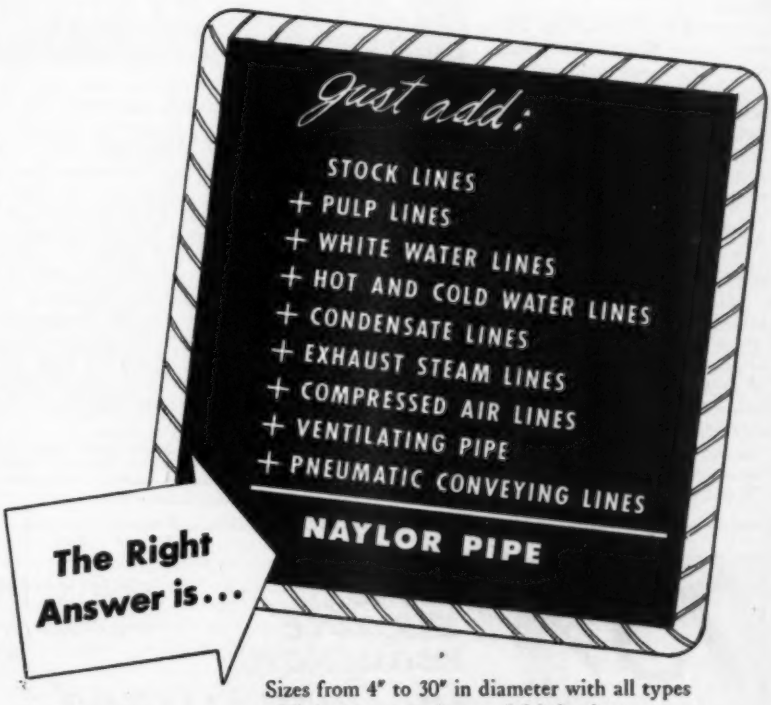

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Transportation The wood supply for your mills is now being brought from greater distances as time passes and rail and truck transportation improves. In the transportation of wood to pulp mills, weather and weather forecasts can be of considerable importance. Forecasts now issued normally should be sufficiently accurate up to three days in advance, to help determine the method of transportation as well as whether delays in arrival of wood may cause a slowing of production.

In addition to these short range forecasts, considerable valuable weather information is available in climatological records, showing over a long period of time in any particular area which periods of the year are usually bad for transportation.

Hydrology or water supply This is important from both long range and short range viewpoints. Quantitative forecasts of rainfall expected in the next 24 or 48 hours are made daily for all sections of the country where rivers exist. Such precipitation forecasts can be used to advantage by your industry. Practically all your mills are near rivers, and many of you use dams for storing water for daily use; it is important to you to know whether enough rain is forecast to justify emptying a dam for some reason, or perhaps if production should be slowed down.

Looking at the long range aspect, I understand water supply is the number one item in locating a new pulp and paper mill. In the United States, and I believe much the same applies to southern Canada, rather complete records are available as to the yearly amount of rain that normally can be expected in any one area. These records tell you whether the rivers or lakes from which you draw your water supply can be relied upon for a steady and sufficient supply. All such information should be available in local climatological records.

Many mills in the deep South are concerned with the rapidly lowering water level. About the only thing I can say about that is that based on the normal yearly amount of rainfall in that region, one can compute how much the water level is going to be increased frm nature's supply, and subtracting the amount your mill takes away, you can get some idea on the eventual outcome. Of course, underground water supplies are trickly. They frequently originate from areas some distance away from where they are tapped. All in all, however, the amount of rain that falls in a given area is going to determine the amount finally available. I think a study of this sort, if not already made, has considerable merit.

I would like to say that there are a number of private meteorological concerns, located in various parts of the country, whose business is to fit weather information available to the particular needs of their clients. Some of you may want to make use of one of these organizations at some time.

Is it always the paper?*

MICHAEL H. BRUNO
Research Manager
Lithographic Technical Foundation

Lithography is one of the four main processes of putting ink on paper which comprise the Graphic Arts—the fifth largest industry in the United States. It is the method of printing which depends on the principle that oil and water do not mix. A lithographic plate consists of two types of areas essentially on the same plane—the image or printing areas which accept ink and refuse water, and the non-image or non-printing areas which accept water and refuse ink.

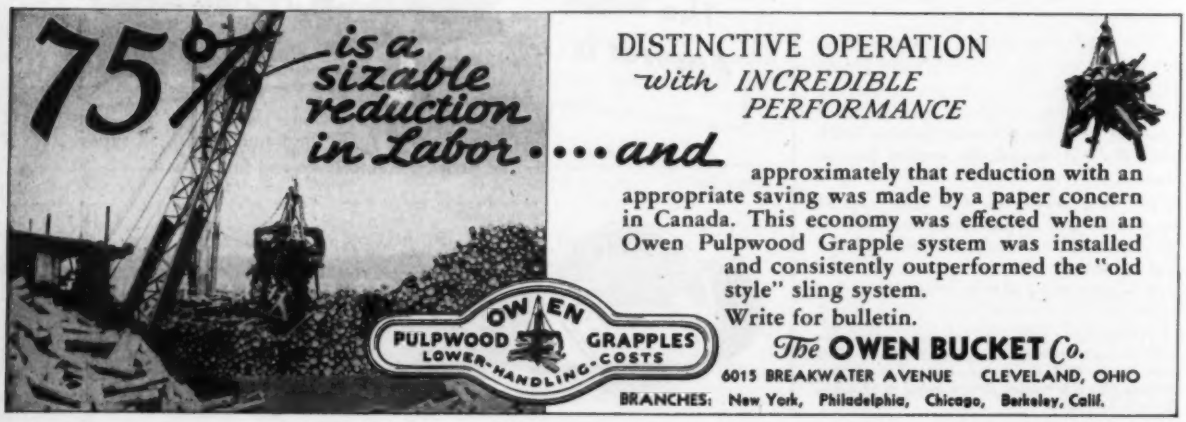
When a lithographic plate is printing on a lithographic press, the plate comes in contact with sets of both dampening and ink rollers during each revolution. The dampening rollers transfer a weak, acidified gum solution to the non-printing areas and the ink rollers transfer ink essentially only to the image areas. During press operations the ink film on the plate splits both as it transfers to the rubber blanket and as it transfers from the blanket to the paper. With proper handling of a good plate on the press, so little solution and acid are needed to print that no harmful effects are noticeable; a poor plate, carelessly handled, requires the use of excessive quantities of acid, gum and solution for dampening. Some of this solution transfers to the inking system and becomes emulsified with the ink, some attacks the image on the plate and weakens it, and some transfers to the blanket and eventually to the paper, causing no end of trouble in ink drying, misregister, and curl.

Lithography is subject to, and capable of, some most perplexing problems. The same problem has been blamed at different times on the paper, the ink, the pressman, or the plate. Our problems are complicated by the fact that the inkmaker often knows too little about paper, the papermaker knows less about ink, and neither knows enough about lithography. Fortunately, the lithographic industry has the Lithographic Technical Foundation which has been attempting for many years to fill the gaps left by this apparent ignorance. We have worked closely with the ink and paper manufacturers to learn the relationships between ink and paper and try to determine and establish the best conditions for lithographic printing. The improvements made possible by our work directly with the ink and paper manufacturers are well known.

The fact that lithography uses water and the offset transfer principle makes many demands on the quality of paper and ink it uses. Ink must be compatible with dampening solutions used, with the desirable strength and properties to produce the right color and density after two transfers from the plate to the blanket and then to the paper. To the papermaker, these requirements seem very simple when compared to those he must meet in making paper for offset printing. Take, for instance, the requirements that the paper must be practically chemically pure so that there will be no harmful reactions with the ink, or plate, or dampening solution run on the plate. Take, also, the increased resistance over other papers to picking and splitting due to higher tack of inks used and the tack and pull of blankets. And then there is still *p*H, moisture content, linting, two-sidedness, static, etc.

Many of the troubles can be associated with failure of the manufacturer to meet these requirements. Register and static trouble are associated with moisture content of the sheets. Troubles with drying of ink, curling (except reel curl) and, to some extent, scumminng and tinting can be traced to the *p*H of the paper, its moisture content, and the use of excessive moisture on the press. Scumming and tinting can be caused by harmful ingredients in the paper; linting, picking and splitting troubles are traceable to poor characteristics in the paper.

(*) Abridged from a paper given before the 31st annual convention of the American Pulp and Paper Mill Superintendents Association, held at Chicago June 8-10, 1950.



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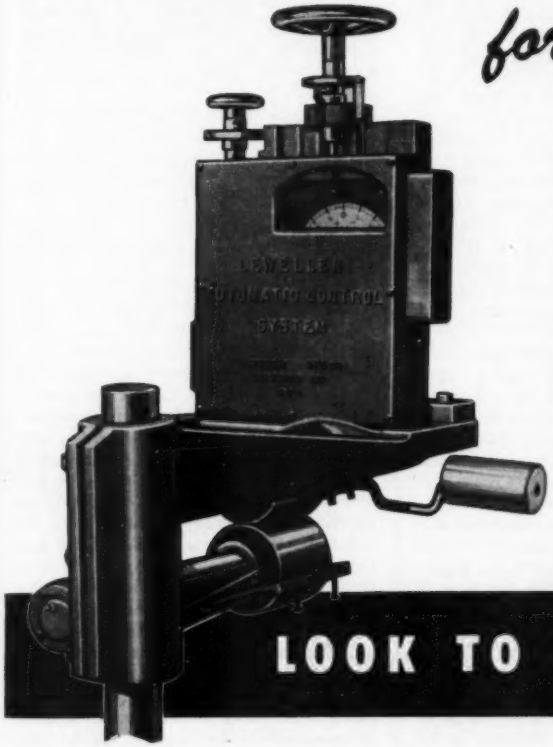

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In all fairness to the papermaker, I'd like to say that the incidence of these troubles is greatly decreasing. In the past several years, however, we have run into some new problems that may be blamed on paper, and also an increase of some old troubles. Two trends which have been very noticeable since the war are the increased use of coated or enamel stocks by the lithographer, and the increasing use of lithography for book publishing. Some of the main troubles we have are definitely associated with these trends.

Three troubles connected with the increasing use of coated stock have been blamed on the paper, and have been investigated carefully. These troubles are slur, embossing, and moisture absorption.

The slurred impression, which shows up as filling in of halftone shadows and a "drag" at the back edge of solids and heavy lettering, is one of the most common defects of offset printing. It seldom occurs on uncoated papers but is a very serious source of complaints on coated stocks. The cause usually is too much pressure between the impression and blanket cylinders at the time of transfer of the image from the blanket to the paper. We have analyzed numerous cases of this problem and find that the trouble is not the coated paper but the lithographer's lack of experience in working with it. We are going to have to contend with slur until the lithographer learns how to handle coated stock.

The second trouble being experienced with the increased use of coated stock is the pulling or breaking of the sheet during printing so that the image areas appear embossed on the printed sheets. Embossing can be due to three things—tacky inks, tacky blankets, or weak body stock in the paper. It happens particularly with coated stocks because these sheets are generally weaker than uncoated papers of the same weight. It usually can be eliminated by using a heavier paper. Embossing, then, cannot be blamed on the paper. It is as much a limitation of the ink as it is of the lithographic process itself.

Moisture absorption is the third of the troubles investigated recently on coated stock. In lithographic printing there is always some moisture on the blanket which transfers to the paper as well as to the image. On a two-color press, the paper must absorb this moisture before the second impression is made. Our main objective in lithographic research has been to develop ways and means of keeping the amount of water that transfers to the blanket down to an absolute minimum. Improved treatments and materials developed for platemaking help to make this possible. However, the papermaker should be able to supply the lithographer with paper that will have sufficient moisture absorption to print without mottling on two and even four-color presses.

So much for coated stock. We have run into two problems on uncoated stock which should be of interest to you. The first is best described as wandering spots; the second is offset or transferring of ink when sheets are handled in finishing, especially in the smasher preparatory to binding books.

Wandering spots are spots that come up in printing and do not remain fixed, but wander over the sheets. It is believed that they are connected in some way to rosin spots in the paper, caused probably by improper precipitation of the rosin size.

Offset in the bindery and in finishing is a very serious problem. It is usually very expensive, since by the time it is discovered it is too late to do anything about it—the job is all printed and cut.

One kind of offsetting, scuffing, occurs primarily on greeting cards, and is the transfer of ink from peak of printing to peak of unprinted paper. When sheets are rubbed over each other, or pressure is exerted, the pressure is all at the peaks, and transfer occurs.

Pressure, the other type of offset, is found in book publishing when the folded and stitched signatures are subjected to the smashing operation. In every instance of this investigated so far, the ink transferred from the wire side of the paper. We believe that this problem is closely related to scuffing, and is a function of the two sidedness of paper. The wire side is always rougher than the felt side; this fact, combined probably with the fact that the ink may not be properly adjusted and may not have dried hard, can account for the offsetting under pressure.

Who is to blame here? It could be the inkmaker, because if the ink were properly formulated and dried hard it shouldn't transfer. It could be the papermaker—maybe there was too much difference in the roughness between the wire and felt sides. It could be the lithographer, who maybe did not adjust the ink to the paper, or was not too careful during running. This problem should be studied very carefully and co-op-

eratively by the lithographer, paper manufacturer, and ink manufacturer. It is possible that the solution may require a change in manufacturing or handling technique on the part of all three participants.

Co-operative study and thinking is the best approach to the solution of any problem. Lithography can be a complicated process, as can letterpress and gravure; no one has all the answers yet. The only way we are ever going to get close to these answers is by all of us—the lithographer, the ink manufacturer, and the papermaker—getting together and attacking our mutual problems co-operatively. We will get much further by working together than by blaming our troubles on one or on the other.

Filtration and papermaking*

B. L. KASSING
Nekoosa-Edwards Paper Co.

We, as papermakers, tend to approach problems from an unnecessarily restricted viewpoint. For instance, fine paper problems are discussed as though totally unrelated to the problems of other papers. Cylinder papers are considered as though entirely different from fourdrinier papers. Tissue production appears to be regarded as an entirely different operation from other papers. The basic sameness of all paper and paper production is usually forgotten; after all various grades are merely variations of the same thing.

It seems to me that rather artificial or merely convenient commercial distinctions have worked to obscure some fundamentals of general nature. The limitations of our approach have tended to narrow our considerations to details rather than general principles. While details are of unquestioned value, fundamentals are vitally important so that it seems that an approach from a comprehensive basis could be worth while.

In any event, I had need for a simple and rational explanation of papermaking, because it was necessary for me to relate different papers and techniques on some fundamental basis. Further, at one time or another, I have been forced to apply experience gained in one field to conventionally different fields. These needs led to an attempt to develop an analysis of the basic principles of papermaking.

I am not so naive to expect that such an analysis will revolutionize papermaking, nor will it solve all our problems. It is quite true that cylinder problems require a different technique than fourdrinier problems. Nevertheless, in my opinion, the problems involved in all papers differ only in degree or in the manner in which they are manifested. In other words, the problems of tissue and heavy weights, fine papers and coarse papers, cylinder and fourdrinier originate in the same phenomena. Basically, they appear for the same reasons regardless of the type of paper or type of machine concerned.

It has been useful to me to think of paper machines as devices to remove water from paper stocks and deliver the stock in such a sheet that it may be profitably sold. Quite obviously, this definition covers any paper or pulp machine or the usual types. Further, regardless of the kind of machine employed, the wet end process is plainly filtration if we accept the usual engineering definition of filtration.

It must be pointed out that in most filtrations, the efficiency of the separation and the capacity of the filter are usually the important aspects of the process. In papermaking, the efficiency of the filtration is taken for granted until the state authorities begin to talk about stream pollution. The filter mat or sheet produced is the principal concern of papermakers.

In this connection and in distinction to ordinary filtrations, we are requently more concerned with the internal structure of the sheet than we are in its general appearance or overall characteristics. This concept is because the filter mat in sheet form is the end product in papermaking. In ordinary filtration, the filter mat is an intermediate or waste product.

By sheet structure I refer to the relation of individual fibers to each other; the number, intimacy and nature of contacts; the area of contact and all the possibilities of interlacing or braiding effects of the fibers. I can only indicate the certainty that these effects exist and determine sheet characteristics. Actually little or nothing really is known about the structure of a sheet of paper and the forces which hold the various elements together.

Regardless of this lack of knowledge, we do control such infinitely fine fiber relationships to some extent. This is so whether we are making fine or coarse papers, tissues or boards, whether we use a fourdrinier or cylinder machine. We adjust the structure and resulting characteristics of our sheets largely by altering the filtering characteristics of our furnish and to a lesser extent by modifying the conditions of filtration or formation.

As in most operations, we are vitally concerned with the entire system. For this reason it is practically impossible to think about papermaking even superficially without being concerned with the behavior of water in motion and the peculiar effects produced as a fibrous mat is laid down from a moving stream of water.

I can offer no definite proof that the motion of the stock affects the sheet structure. I can only say that most paper characteristics indicate a type of structure which would be expected if the structure was influenced by the flowing fluid as well as the filtering characteristics of the stock. The hypothesis developed has been useful not only in leading to a rational explanation of papermaking but also in actual problems of design and operation. Just as important perhaps, it has established the validity of some of the old techniques and rules which have been used for many years.

For instance, there is the old saying, "Paper is made in the beaters." This old saying is literally true in the sense originally intended even though we may have substituted some type of refiner for beaters. The reason that it is so is because beating or refining of the stock determines the compactness and compressibility of the mat or sheet. To a very considerable extent it also governs the intimacy and extent of fiber to fiber contacts. This in turn determines the filtering characteristics of the mat or, as we call it, the freeness of the stock. The freeness of the stock determines the capacity of the wire or cylinder as a filter. Thus beating or stock preparation determines the characteristics of the sheet produced as well as the capacity of the machine.

Most sheet characteristics appear to be explainable on the basis of filtration analysis. We all recognize that machine-made paper has a definite grain. We usually accept as fact that cylinder sheets exhibit greater differences with and across grain than fourdrinier sheets. I think that the origin of grain lies primarily in phenomena of fluid-

(*) Abridged from a paper read at the 31st annual convention of The American Pulp and Paper Mill Superintendents Association, Inc., held at the Edgewater Beach hotel, Chicago, June 8-10, 1950.

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flow wherein at some velocity or speed the fibers tend to line up with the general direction of flow. For this reason, grain originates at or very close to the slice.

I admit that this involves considerable speculation, however, it is not unreasonable on the basis of what is known about flowing fluids. The great number of failures to eliminate grain justify the conclusion that some fiber alignment is inherent in our processes of making paper.

This primary alignment is still further increased by any differences between wire speed and stock velocity at the instant of contact of the stock on the wire. This is a mechanical effect and can be quite important because it is partially controllable. When the wire speed exceeds the stock velocity, a sort of a combing effect appears inevitable. When the slice velocity exceeds the wire speed increased alignment is more difficult to explain but it certainly occurs.

It must be noted that other conditions, particularly drying, develop grain effects. These effects cannot be ignored and may be very important since, in general, they are detrimental effects. Drying conditions, however, are outside the scope of this discussion.

When we must minimize directional differences, we generally find observance of a well established principle of maintaining the stock velocity as close as possible to the wire speed. When directional differences are not undesirable, we usually find some difference in wire speed—stock velocity.

The extreme directional effects shown by cylinder papers seem to be due to the mechanical effects producd by differences in speed between the stock and cylinder wire. Analysis shows that it is extremely difficult and in some cases impossible to cause paper fibers to contact the cylinder with the same velocity as the cylinder. This accounts for the fact that grain differences are more pronounced in cylinder sheets than with fourdrinier sheets. The difference appears to be due entirely to the conditions of filtration under which the sheet is formed.

There seems to be a widely held opinion that the shake on a fourdrinier serves to cross the fibers and thereby reduced grain. This appears to be the basis for numerous attempt to reduce grain effects by agitating the stock in cylinder vats. Such devices can be of little help in this regard. Actually, on a fourdrinier, the shake merely jars aggregates or clots together. It has no particular effect on the arrangement of individual fibers. It does, of course, improve or level the visual formation but the sheet structure and arrangement of individual fibers can be affected only very little.

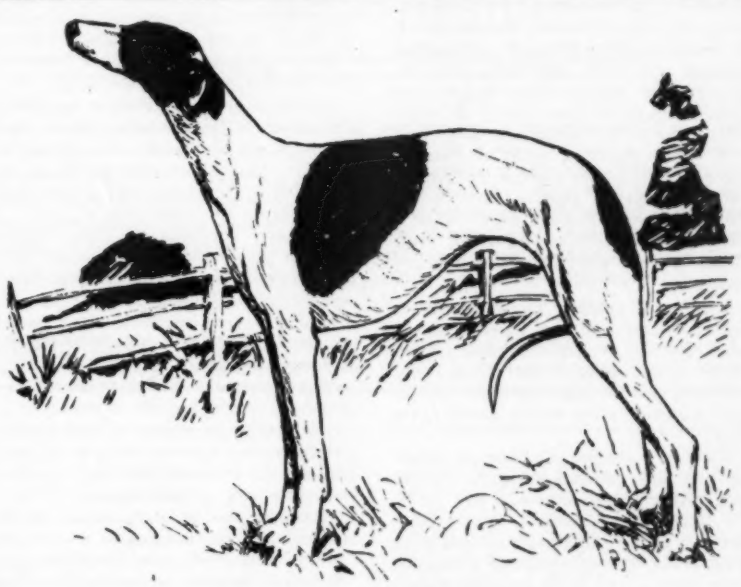
Paper is two-sided. This two-sidedness is more than a simple difference of color or finish—there is an actual structural difference between the two sides. This structural difference results from the condition of the stock and the conditions of filtration on the wire. This lack of uniform structure is responsible for many of the undesirable characteristics frequently shown by paper and is inherent in our methods of sheet formation. While we may succeed in minimizing this undesirable structural difference, we can never totally overcome or eliminate it.

This is because the two sides of the sheet are formed under totally different conditions of filtration. First of all, wire side fibers tend to become aligned in the machine direction to a greater degree than the top side fibers. Second, and equally important, fine elements of the furnish tend to wash out of the wire side, and possibly become concentrated on the top of the sheet. Thus the density of the top side is higher than the wire side. For these reasons, two-sidedness is a difference in structure between the two sides. This difference results from the fact that the two sides are composed of elements of different dimensions in different structural arrangement.

The result is a sheet which curls under the slight provocation of humidity changes since its expansion-contraction characteristic is different on the two sides. It is inherently unstable if free to respond to strains. It may also be remarked that the two-sided structure of the sheet precludes the possibility of the same drying rate occurring on the two sides. Due to this, we can produce paper which is warped or has a permanent curl when made.

If there are any printers or other paper buyers present, it is to be noted that I only said that we can produce curled paper. I did not say that we do.

I am very conscious that I have ignored many important aspects of papermaking. This is only because I have attempted to stick to one important process which is fundamental and basic to all papermaking. This process is filtration, and supplementary processes and operations have not been mentioned.



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Maintenance of antifriction bearings in paper machine dryer sections*

M. J. WESTBROOK
General Superintendent
St. Regis Paper Co.

This paper is an attempt to present from a mill operator's point of view some of the problems encountered in the care and maintenance of antifriction bearings in the dryer sections of high-speed paper machines. The dryer bearing in general use on a modern machine is of the spherical roller type with a taper fit, having a life expectancy of ten years, if properly installed and maintained.

A very pertinent point on the maintenance of dryer bearings has to do with the accessibility of the bearings for inspection and replacement. Machinery builders in recent years have been designing and building machines with ready accessibility and visibility of dryer bearings. Extending a dryer journal through the gear case is of inestimable value to the operator. It saves time when it is necessary to inspect or change a bearing. It also makes possible the installation of windows of glass or Lucite in the bearing housings. These windows make it possible for an oiler to inspect all dryer journal bearings while a machine is in operation.

A particular machine on which serious bearing failures have been experienced was designed to use two separate oiling systems for the dryer sections. One system is for the antifriction bearings; the other, for the gears transmitting the driving power to the dryers.

There are a number of advantages in having two such lubricating systems for the dryers. Among these advantages are:

1. Considerable saving in cost of lubricants can be made by using premium grade of oil in the bearing lubricating system and a less expensive oil in the gear train system.
2. Ability to keep the oil for the bearings clean and relatively free of moisture. (This second advantage probably is of greater importance than the first.)

The structure of the housings of the intermediate dryer gear bearings on the machine under consideration allows oil to transfer from the bearing system into the gear train system. This condition has made it impossible for the benefits of the two separate systems to be realized. The transfer of oil occurs when using the lowest safe oil feed rate to the intermediate bearings, at the rate of approximately one barrel per day. This difficulty has made it necessary to use one lubricant to do both jobs; the excess oil in the gear lubricating system being passed through a centrifuge before returning to the bearing system.

The development of continuous forced-feed lubrication systems does not appear to have kept pace with the development of the modern paper machine. Certain changes in the lubricants now being used for antifriction dryer bearings make it necessary to maintain much larger oil reservoirs than usually are furnished by the manufacturers of this equipment. It has been found necessary to allow longer periods of time for settling of the impurities picked up by a lubricant.

The old system of washing a lubricant appears to be of no advantage with the lubricant now recommended by the lubricating engineers. There is room for improvement in the filters used for removing foreign matter from the oil. It is believed that the conical type of filter will do a better job than the bag type filter now being used.

Permanent magnets should be installed in the system to remove any metallic iron. There should be an installation in the return line from the bearings to the oil system; also, in the discharge line of the pump supplying oil to the bearings.

Frequent inspection of these magnets make it possible to detect bearing failure that has progressed to the point of flaking metal from the bearing race. Unfortunately, the discovery of metal at these magnet points does not indicate which particular bearing is failing. However, it does let the observer know that he has trouble. Then a shutdown can be planned to remedy it.

This magnetic removal of iron from the oil system prevents the return of the metal flakes to do damage to those bearings which otherwise have not been harmed.

For a number of years, major oil companies have been working on the development of suitable lubricants for the job under discussion. Progress has been made in their research; and as development programs go forward, no doubt still further progress will result.

Paper machines, to a degree, like individuals, seem to have their individual peculiarities and idiosyncrasies. Therefore, the lubrication engineer must take this characteristic into consideration in making a thorough study of any machine for the purpose of recommending the lubricant which, in his opinion, is the proper one to use.

The recommendation may vary with the section of the country in which a machine under study is located. Climatic conditions may make such a recommendation necessary. For example, if a machine is operated in a climate that is very humid it is necessary to include both an inhibitor and a detergent in the lubricant.

This matter of bearing maintenance is not a new one; but it continues to present new problems. The solution of these problems lies in the co-operation of the operators, the machine builders, the bearing manufacturers and the lubrication engineers. It also is necessary to couple this co-operation with the unceasing vigilance of the oilers on the paper machines.

(*) Abridged from a paper read at the 31st annual convention of The American Pulp and Paper Mill Superintendents Association, Inc., held at the Edgewater Beach hotel, Chicago, June 8-10, 1950.

Synthetic resins and the latest developments in the resin field*

ROBERT L. PETT
National Adhesive Division
National Starch Products, Inc.

The adhesive industry has undergone a great many changes in the past 15 or 20 years and I am sure that you will agree with me that the innovation of synthetic resin adhesives is the most significant. I will attempt to give you a general outline of the most significant uses and developments in the synthetic resin field to date. With the development of cellophane sheeting, plastic films, improved coatings for paper, and high speed packaging machines the adhesive industry was forced to look for other types of base raw material than starches and dextrines to be used in the formulation of their adhesives. After exploring many fields we finally found that the synthetic resins showed the most promise.

The first synthetic resin adhesives were the solvent lacquer adhesives. The cellophane industry quickly adopted them for use in the manufacture of cellophane bags and laminations of cellophane to various surfaces. These lacquers proved quite satisfactory in most respects. However, they were fairly slow drying and the concentration of solvents often caused bleeding of inks. We took this problem under consideration and came up with the resin emulsion type adhesive. Generally speaking, emulsion adhesives consist of a resinous base material dispersed in water, a plasticizer, and often times a solvent. Simply by changing the ratio of resin and plasticizer these adhesives can be made faster or slower, harder or more flexible. Solvents are added to give penetration into special lacquer coatings on paper, or to penetrate films such as cellulose acetate or cellophane. Emulsions are fast setting because as soon as they come in contact with a surface the emulsion breaks. Starches, dextrines and animal glues tend to dry out and crystallize while the resin emulsions remain flexible and do not soften under high humidities and temperatures.

Along with the lacquer and emulsion adhesives, we have developed the hot melt type of adhesive. A hot melt is in a solid state at room temperature and must be heated in

(*) Abridged from paper given at Chicago, May 12, 1950, before the Chicago Section of the Technical Association of the Pulp & Paper Industry, Inc.

USED EQUIPMENT
EXTENSIVE INVENTORY of used paper-mill machinery. Preparatory — forming — converting. Many bargains. Satisfactory guarantee.
SHARTLE BROS., Middletown, Ohio

GRINDERS
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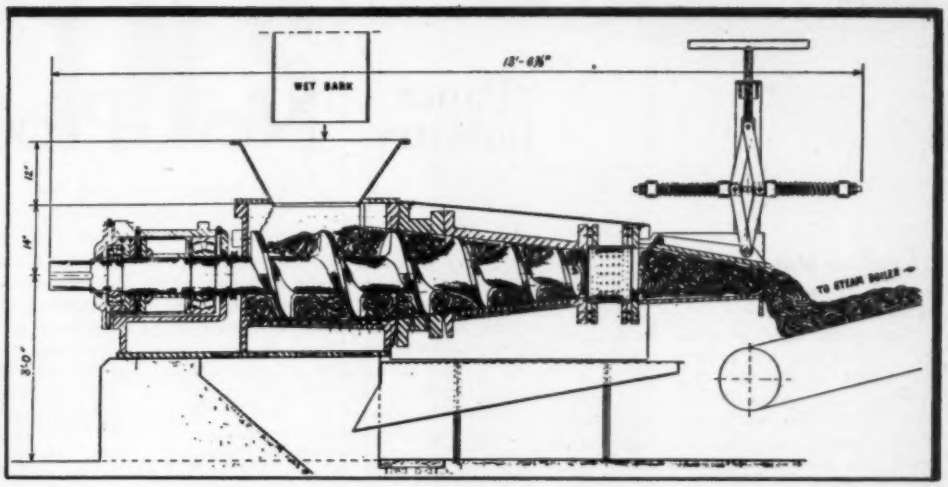
SAMUEL C. ROGERS & CO.

CUT FUEL COSTS BURN BARK



Dewatered bark is good fuel. The Defibrator Bark Press, reduces the moisture content of wet bark to 55% or below. In this state, the bark burns readily, and has about half the fuel value of coal.

•The press utilizes the Defibrator screw feed principle. Wet bark, containing about 85% water, is fed through a hopper to a tapered throat where it is compressed by a screw. The water is squeezed out and drains through numerous small holes. Further extraction takes place as the bark passes through the drainage pipe.

In installations now in operation, processing capacity is approximately 5 tons per hour (on a bone dry basis), and power consumption at this capacity runs between 35 and 40 H.P. Main body is cast steel; compression screw throat and outlet pipe are stainless steel; heavy duty bearings and construction throughout assure long life and minimum maintenance.

AMERICAN DEFIBRATOR, INC. CHRYSLER BUILDING NEW YORK 17, N. Y. *West Coast:* A. H. Lundberg Orpheum Building, Seattle, Wash.

order to get it to a fluid consistency. These hot melts contain neither solvents nor water and have 100% solids. Hot melts are well adapted for use as protective coating and for applications where immediate setting time is necessary.

Perhaps the newest and most important class of adhesives developed to date are the heat seals developed in the three classes of resins mentioned; i.e. emulsions, lacquers, and hot melts. The heat seal adhesives can also be subdivided into the direct contact and delayed tack type. The direct contact heat seal is coated on a surface and allowed to dry. At a later time this surface is brought into contact with another surface and heat is applied. A bond is effected instantly. The delayed tack type is coated and allowed to dry, but is reactivated with heat, and develops a high degree of tack immediately. The advantage of this delayed tack lies in the fact that the two surfaces do not have to be in contact when heat is applied.

At the present time most of these heat seal adhesives are of the emulsion type. However, we have developed lacquer types which are particularly adapted for bonding coated surfaces, foil and cellophane. Along these same lines there are hot melts which are used as heat seals.

A delayed tack adhesive finds use in the bottling industry where the label is heated and then placed on a bottle. The direct contact heat seal type finds uses in fields such as gummed tape, jewelry boxes, and in manufacturing milk cartons. The hot melt is well adapted for use by manufacturers who coat rolls of paper and then print and cut them into labels.

The chemical industry has been making rapid strides in developing new transparent plastic sheetings; we now have adhesives for saran and pliofilm which give excellent adhesion. Polyethelene is resistant to alkali, acids and until now most adhesives. We have finally overcome this defficulty, however.

Other fields requiring resins are water resistant foil laminations and coatings for inked surfaces. Several of these laminations are being made today and the outlook for the future is for more and more of these combinations. Along these same lines there are many manufacturers who are attempting to coat printed and plain surfaces with materials to replace acetate laminations.

Animal glues*

SAM SCHULLER
Technical Director
Paisley Products, Inc.

Animal glue is undoubtedly the oldest adhesive material known to mankind. There is no current indication that animal glues will be supplanted in those packaging operations where it is now established as no synthetic adhesive material has ever been developed which contains all the useful characteristics of animal glues at a comparable cost.

Animal glues in commercial use are divided roughly into two classes: hide glues and bone glues. Hide glues are prepared chiefly from tanners' hide trimmings. Bone glues can either be extracted from green bones or dry bones. Hide glues are considered the better adhesives, dry bones the next best and green bone glue, the lowest quality of all.

All animal glues swell in cold water, dissolve in hot water and form a jelly on cooling. Chemically, they are a member of the colloidal group of adhesive materials. Steady advances in colloidal chemistry through research has continually improved the compounding technique of adhesive manufacturers and the cake form glues available today greatly out-perform the adhesives of yesterday. Their ability to liquify under heat and solidify or jell on cooling makes animal glues valuable for many industrial and packaging operations.

Animal glues are evaluated from their qualities of jelly strength, viscosity, melting point and setting point. Other qualities important to packaging adhesive use include clarity, odor and chemical contents. Both non-warp and flexible glues are compounded from hide and bone glues by blending the various plasticizing materials, coloring ingredients, essential oils, defoaming agents and preservatives. The modern adhesive chemist is a believer in specialization of compounding a formula that will fit the particular package manufacturer's labeling or sealing operation with highest efficiency rather than by compromising to achieve interchangeability.

Some of the advantages of non-warp and flexible glues are a high margin of safety in bonding strength, formation of thin films,

(Turn to page 68)

(*) Abridged from paper given at Chicago, May 15, 1950, before the Chicago Section of the Technical Association of the Pulp & Paper Industry.

The Paper Industry New Products

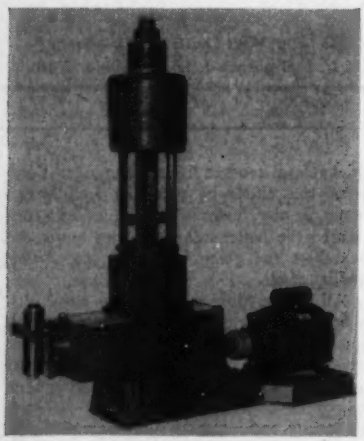
Capacitor Motor

For use wherever power supply demands single-phase operation.

Single-phase capacitor motor is of cast iron construction and presents a smooth, streamlined appearance. Capacitors are mounted in the base of the motor, and there is no conduit box on the side, for it has been replaced by a built-in terminal board inside the end shield for easier wiring. Motor features the Tri-clad motor triple protection against physical damage, electrical breakdown, and operating wear and tear. Built-in starting switch is totally enclosed to keep foreign matter from the contacts. General Electric Co., Schenectady 5, N. Y.

Pneumatic Power Operator

Employs a reversible pneumatic motor and gear driven screw stem.



A different type of pneumatic power operator for valves, dampers and other control devices combines the features of a self-locking stem, simple, continuously connected handwheel, sensitivity and small, compact size. Additional features are accurate positioning to within 1/500th part of stem travel; sensitivity to instrument changes as low as .025 psi; high stability; stem loads up to 10,000 lb; stem travel up to 20 inches; stem speeds up to 12 inches per min; adaptability to any type of heavy duty throttling control application. Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa.

Lift Truck

Incorporates more than 70 basic improvements.

Among engine changes of the 2000-lb. lift truck are a new intake manifold; redesign of shrouds to pull cool, clean air from the sides of the machine rather than from top or bottom; new electric fuel pump; and a new distributor. The air-cooled engine can withstand great extremes in weather conditions. Engine accessory improvements include a larger automotive-type battery, re-designed muffler with spark arresting features; and larger gasoline tank. Tilt control of uprights is accomplished through double-acting hydraulic cylinders for both directions of tilt. May be fitted with the usual Hyster special-purpose attachments. Hyster Co., 2902 N. E. Clackamas St., Portland 8, Ore.

Protective Coating

Can be used for waterproofing textile, paper and leather.

Ceramid, a synthetic wax, is insoluble in water and more soluble in organic solvents than natural and other commercial synthetic waxes. Absolute alcohol will dissolve 5.4 grams per 100 cc. In tuluol and naphtha 3.8 and 3.4 grams respectively can be dissolved. Its use is indicated for protective coatings and films to be deposited on various surfaces out of solvent solution. It emulsifies readily, giving a white matt finish which can be rubbed to give a high polish. May be used as an anti-tack agent for resin organisols; as a mold lubricant for rubber and plastic goods and to prevent sticking of finished articles. Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N. Y.

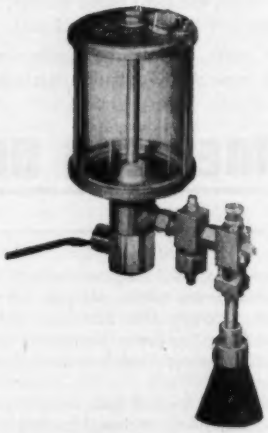
Diaphragm Valves

Cast iron body type may be either rubber lined or glass lined.

Angle type diaphragm valves are constructed of cast iron, stainless steel, durirment, aluminum, and Everdur. The screwed end type is offered in sizes of 1 in., 1¼ in., 1½ in. and 2 in., and the flanged end type in 3-in., 4-in., 5-in., and 6-in. sizes. From an installation standpoint, the angle valve fits in many situations where a straight through valve is practically unusable. It is possible to mount on these valves the same types of air cylinders and electric motor operators, extended stems, flexible cables, and other aids to remote operation as have been successfully employed in connection with this company's straight through type of valve. Hills-McCanna Co., 3025 No. Western Ave., Chicago 18, Ill.

Chain Oiler

For automatically lubricating conveyor chains.



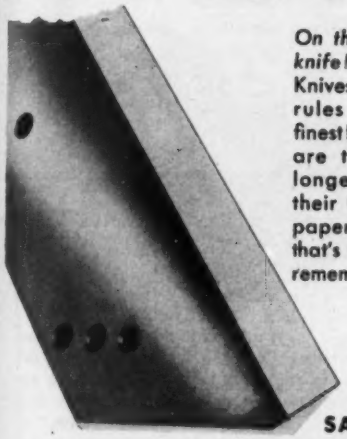
Solenoid operated oiler assures lubrication whenever the chain is running, and eliminates the need for applying lubricant by hand. This unit feeds lubricant by gravity from a reservoir through a solenoid operated valve and a sight feed valve to a brush which rides the chain, spreading and wiping desired amount of oil evenly on the chain. Can be easily taken apart for cleaning. Oil-Rite Corp., 3495 S. 13th St., Milwaukee 15, Wis.

Goniophotometer

Has tristimulus filters for measurement of color as a function of illumination and direction of view.

The Hunter goniophotometer is used to measure the manners in which flat specimens reflect and transmit light with changing directions of illumination and view. It consists of a stationary photocell which receives light, a specimen table which may be rotated to place the specimen in any desired attitude with respect to the photocell, and an illuminating arm with light source for directing a beam of light onto the specimen from any desired direction. Actual measurement of the first photocell current in terms of the second is made with either this com-

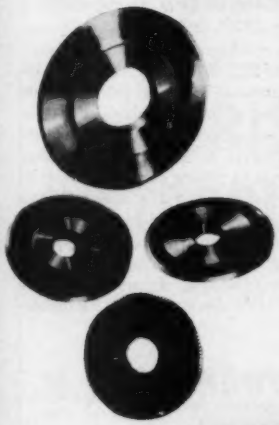
ATKINS



On the steel depends the knife! . . . And Atkins Paper Knives, slitters and creasing rules are made of the finest! . . . That's why they are the longest-lasting, longest-wearing tools of their types known to the paper industry! . . . And that's why it's important to remember that—

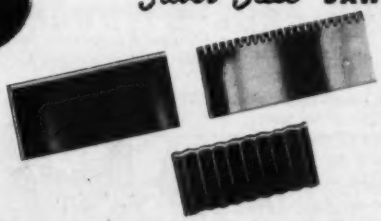
Only ATKINS MAKES *"Silver Steel"* SAWS AND KNIVES

PAPER



It's no accident—no mere coincidence—that so many of the nation's most successful paper stock houses, mills and printers insist on Atkins *"Silver Steel"* cutting, slicing and creasing products. Over a period of many years they have discovered that—

OF ALL FINE SAWS AND KNIVES—THE FINEST ARE *"Silver Steel"* SAWS



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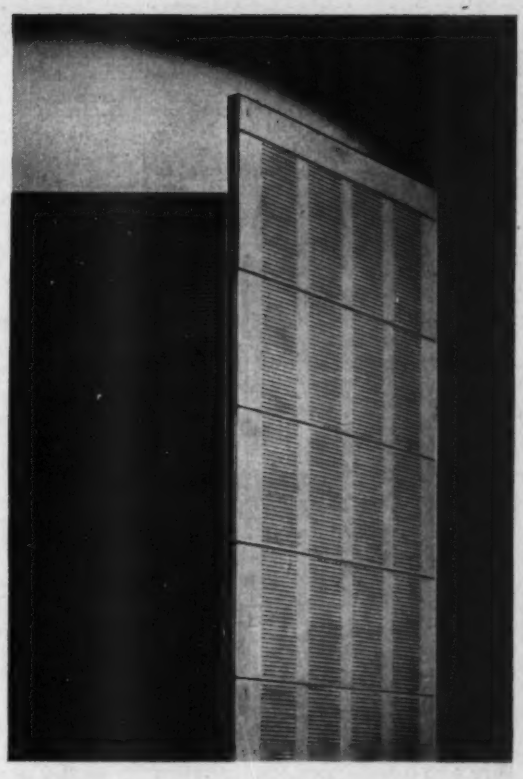
KNIVES



3 Good Reasons Why
28,000 FABRICATED SCREEN PLATES
Are Now In Service

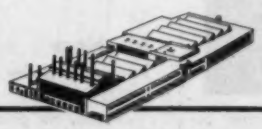
"Hardy" fabricated screen plates, made by Magnus, have a high-strength, thin-sheet design — specially engineered for maximum flow. That's why you're sure of these 3 service-proved advantages:

(1) Increased Plate Capacity — The thin sheet eliminates relief milling, and with recommended arrangement, substantially increases capacity per plate.

(2) Longer Life — Slots remain sharp, side walls highly polished for the life of the plate. There's greatly improved corrosion resistance.

(3) High, Sustained Yield — You get consistent, uniform quantities of cleaner pulp.

It all adds up to improved performance at reduced operating costs. Complete information is yours on request. Or if you like, we'll gladly have an engineer call.



MAGNUS METAL CORPORATION
FITCHBURG, MASSACHUSETTS

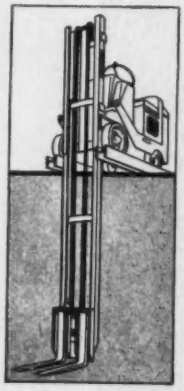
Metalworkers for the Paper Trade

SCREEN PLATES: BRONZE, CHROME-NICKEL-STEEL, AND INCONEL
VALVES: GATE, SWING CHECK, BLOW, GLOBE, ANGLE AND "Y"

pany's Photometric Unit or the Color-Difference Meter (only the R_4 scale of the latter is used). Henry A. Gardner Laboratory, Inc., Bethesda 14, Md.

"Elevator" Truck

Lowers and raises heavy loads between balcony storage areas and first floor production line.



A special non-tilt mast and carriage assembly, mounted on a standard Towmotor fork lift truck, permits load carrying forks to be lowered 98 inches below balcony floor level. Elevator unit has a lifting and lowering capacity of 2000 lb. Capacity loads can be lifted from first floor to 10 inches above balcony floor level. Towmotor Corp., 1226 E. 152nd St., Cleveland 10, Ohio.

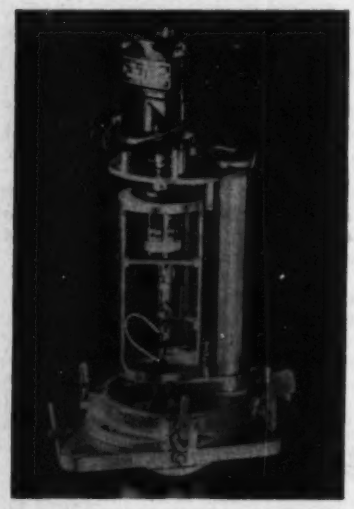
Magic-Grip Coupling

Easy to install or remove from shafts of pumps or motors.

Consisting primarily of two cast iron discs with tapered bores, rubber covered tubes assembled on studs, split tapered bushings, and two set screws for each disc, the new Magic-Grip coupling is interchangeable with the old standard coupling. It is available in two bore sizes, ⅝ and 2⅛ inch, both taking up to 120 hp. at 3550 rpm. Allis-Chalmers Co., Milwaukee, Wis.

Viscometer

Indicates and records viscosity changes as small as one-half of 1% of scale.



Continuous accurate indicating and recording of the viscosity of numerous industrial liquids while under actual processing is now possible by use of a device called a ViscoMaT. This viscometer is particularly adaptable for use in the paper industry, also in chemical and plastic fields.

It is claimed the device eliminates sample taking, provides continuous measurement, measures viscosity in strongly agitated solutions, and is engineered to meet individual requirements. When used with an ElectroniK recorder, it can be used as an automatic controller with built-in audible or visual alarms. ViscoMaT is a product of Brookfield Engineering Laboratories, Inc., Stoughton, Mass. ElectroniK recorder is made by Brown Instruments Div., Minneapolis-Honneywell Regulator Co., Wayne and Roberts Aves., Philadelphia 44, Pa.

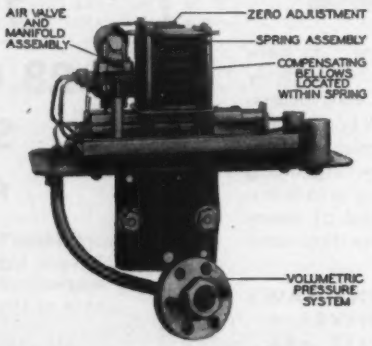
Safety Measure

Flashes safety slogans by a combination of light and motion.

Messages on an M.S.A. Flash-O-Graph are spelled out in bright dots of light which move along continuously like electric news bulletins. Unit is cased in steel with a black crackle finish. It measures 23 in. x 3 in. x 6 in. and weighs 6½ lb. complete. Flashing action is provided by a replaceable, endless, perforated tape which is illuminated by a fluorescent lamp. Tape passes continuously behind a glass window through which any of 52 standard, or individually ordered, messages are projected. Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.

Pressure Transmitter

Measures and transmits up to 1000 ft. the smallest of pressure changes.



An accuracy of ½% of the range span is possible with this new force-balance type pressure transmitter, which offers closer control to instrument users. Narrow range spans of 20 to 40 psi are available over range limits of 35 to 415 psi with sensitivity of .1% or .02 or .04 psi depending on range span used. Regardless of the pressure range or span, the output of the transmitter is always linear from 3 to 15 psig. Operating ranges can be varied with range limits and range limits can be shifted. Taylor Instrument Cos., Rochester 1, N. Y.

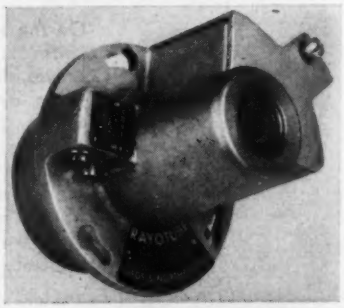
Air Hose

Tube and rubber made of oilproof rubber compounds.

Besides its primary use as an air hose, this product can also be used for handling petroleum solvents and lubricating oils. It is made with a smooth finish red cover with extra toughness to resist weathering and sun checking. Strong adhesion of cover to the carcass enables the hose to withstand repeated bending and flexing with less danger of separation. Tube will not flake off to plug attachments or tools. The B. F. Goodrich Co., Akron, Ohio.

Radiation Pyrometer

Features quick sighting; stability in drafts and hot spots.



Built to work with all Micromax and Speedomax Rayotube instruments, this detector is claimed to be unusually easy to apply, especially to such equipment as slab furnaces, soaking pits, ceramic kilns, or wherever operating conditions are severe. Quick sighting optical system lets user select desired target easily. Hermetically sealed construction at lens, window, and leadwires keeps out dust and gases. Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

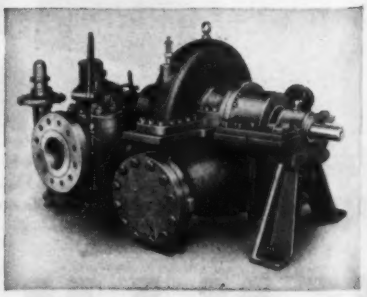
Safety-Relief Valve

Provides a balanced ratio between orifice diameter and guide diameter.

The balance design feature of this valve, plus the Farri-Seal bellows, restricts the effect of back pressure surges to the minimum. Also, the valve permits an increase in the allowable down-stream pressure drop with resultant decreases in header size and consequent savings in piping costs. Officials of the company believe that the design of this valve provides a solution to many problems created by back-pressure surges when downstream piping is used to salvage fluids which would otherwise be lost. Farris Engineering Corp., 521 Commercial Ave., Palisades Park, N. J.

Single-Stage Turbine

Designed especially for high pressure service.



The De Laval CP turbine is claimed to be the first single stage, mechanical drive turbine with all labyrinth shaft seals which prevents leakage effectively, reduces losses, lasts longer and requires less maintenance. The turbine is supported at the true center-

Peak Screening Performance
H & K PERFORATED METALS

√ Bull Screens
√ Chip Screens
√ Pulp Screens
√ Digester Bottoms

- Smooth, easy-to-clean surfaces
- Accurate and uniform hole sizes
- Standard or special perforations
- Stainless steel and corrosion resisting alloys a specialty
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One No. 8 Wellman Wood Grab. Capacity ½ cord 8 ft. wood. Excellent condition. Address: Box 499, The Paper Industry.

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Many contacts in the paper mills, paper converting plants of New England States, New York and New Jersey. Seeks connection with manufacturer machinery. Will sell on commission basis. Office in downtown N.Y. Address: Box 500, The Paper Industry.

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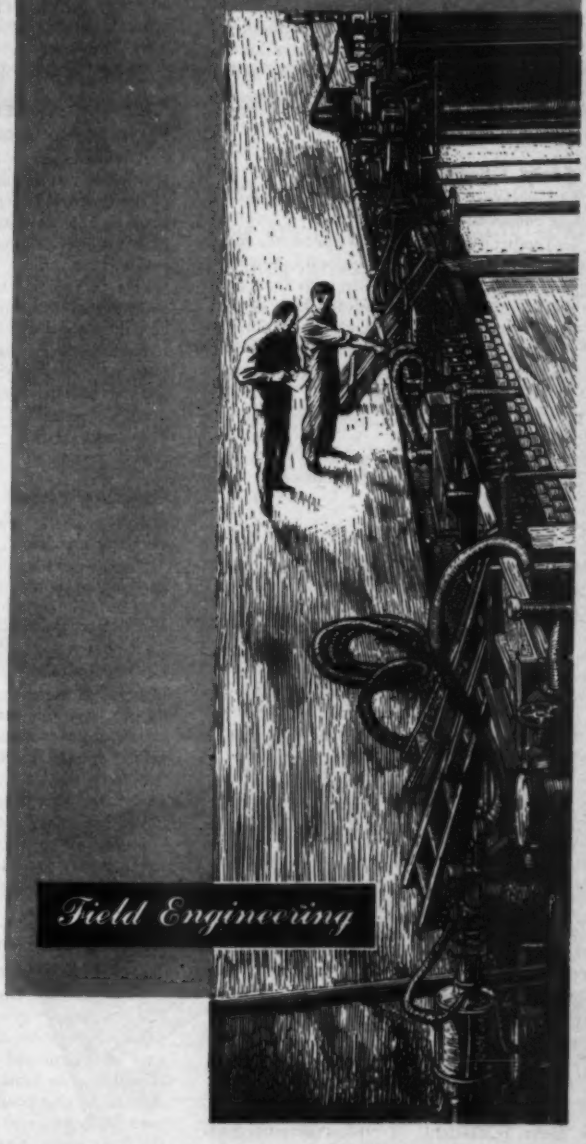
Appleton Wires are Good Wires



APPLETON WIRES are serviced in the field by experienced, qualified Sales Engineers.

APPLETON WIRE WORKS, INC.
APPLETON, WISCONSIN

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line and the front end is mounted on a flexible channel. This permits both radial and axial expansion to take place without disturbing the shaft centerline. The turbine can be furnished with any of eight different types of governors including mechanical shaft, vertical flyweight with or without oil relay, hydraulic with or without oil relay, pressure governors for pump and blower drives and auxiliary tripping devices. De Laval Steam Turbine Co., Trenton 2, N. J.

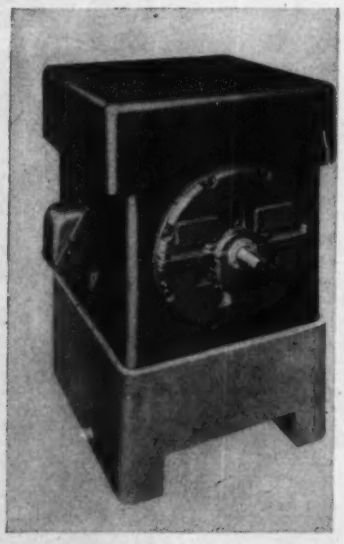
Strip Chart Recorder

Air-operated, unit has only two external air connections.

Temperature, speed, flow, pressure, static grain loads, a-c and/or d-c volts, amperes, etc., can be measured easily with the Pneumatic Capacilog. Control function is performed by power of air operating diaphragm motors connected to valves, dampers, levers, pistons, etc. Wheelco Instrument Co., 847 W. Harrison St., Chicago 7, Ill.

Auxiliary Motor

Developed for outdoor installations.



Modified base-ventilated motor, designed for external applications such as driving power station auxiliaries mounted out-of-doors, is available in ratings ranging from 200 to 3000 hp. Ventilating air enters the motor through a vertical passage in the base, and is pulled from the ambient air stream at low velocity. It is claimed that at such a low velocity, almost no water or foreign matter can be carried up vertically into the motor. As an additional precaution, baffles are fabricated within the air intake passage to eliminate even small amounts of foreign matter. Ventilating air is exhausted from the top. General Electric Co., Schenectady 5, N. Y.

Glass Electrodes

Color-coded for three ranges of solution temperature.

These new *p*H-responsive, moisture-proof glass electrodes offer such outstanding benefits as fast response and low resistance, resulting in accuracy at low temperature and minimized insulation problems; with sodium error so low that the same electrode can be used for any range of acidity or alkalinity. To assure high insulation and low electrical leakage, electrode leadwires are permanently attached, molded into the plastic electrode head. Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

Chlorine Feeder

For industrial applications.

A chlorinizer for feeding chlorine gas is claimed to insure completely safe and highly accurate operation. A positive and accurate chlorine rate indicator with direct reading linear scale assures ease and accuracy of readings at all rates. Maintenance due to corrosion is reduced to a minimum because chlorine is controlled and metered in the dry, inert state. Feeder is readily adapted to semi-automatic, program or automatic proportional operation; conversion from one method of operation to any other may be made in the field. Builders-Providence, Inc., Providence 1, R.I.

Coating Pistol

Offers practical means of applying polyethylene and films.

Versatile Schori pistol, designed for flame spraying of polyethylene, is equipped with a new front end that enables the gases to mix externally, thus resulting in a longer and over-all cooler flame. This flame uses acetylene or natural gas and compressed air instead of the standard Schori mixture of oxygen, gas and compressed air. A modification of the front end of the regular Schori pistols is available for converting all of the Schori models except the Standard to this new flame. Units consist of the pistol, all hoses, powder container unit including vibrator, air distributor and all necessary tools. Schori Process Div., Ferro-Co Corp., 8-11 43rd Rd., Long Island City 1, N.Y.

Towing Tractor

Facilitates order-selection work.

Combination clutch-and-throttle control bar extending across the width of the Clarkette-5 above the cowl makes possible ease of control and driving while the driver is walking on either side of the tractor. In normal driving position, the operator stands on a platform only a few inches higher than the floor, saving time and effort in mounting or dismounting. If positive braking is necessary while driver is walking, he touches a foot to the brake bar at the rear of the driving platform. Tractor will tow ten tons on trailers over a level course at speeds from 1 to 6.5 mph. Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.

Caulking-Type Material

For weather-tighting pre-fab houses and other new constructions.

This special pile fabric is impregnated with an amber colored moisture-proof compound containing inhibitors against mildew, rot, termites and other insects. It is available in tape form, 1 to 3 in. wide in 100 ft. rolls, and is claimed to be clean-handling, self-sealing, and a time and labor saver because it is applied by simple hand pressure. Tape is not affected by temperature changes and structural vibrations. Water-vapor barrier factor is claimed to be almost 100%, which provides long-lasting protection against water, moisture, wind and cold air from the outside, and against interior heat losses. Arnaud Corp., 17 John St., New York 7, N.Y.

Motor Drive

Adaptable to a wide range of machinery.

Reliance V★S Drive (¾—2hp.) takes power from a-c lines and provides smooth starting, jogging for set-up, and adjustable speed over a wide, stepless range. All functions are at the operator's finger tips in the control station which may be placed at any convenient location. Wiring is the only connection involved between operator's station, control unit and motor. Reliance Electric & Engineering Co., 1111 Ivanhoe Rd., Cleveland 10, Ohio.

Circular Saw Grinder

Accurately grinds top, face and side of each carbide tip.

Rogers Type SC grinder is designed to handle any carbide tipped circular saw from 4 to 20 inches in dia. and larger on special order. Assembly consists of a sturdy bracket to which the blade is securely fixed by wide dia. support collars. Careful tooth positioning is maintained by a positive index plate. Entire assembly can be moved to adjust for different saw diameters. Samuel C. Rogers & Co., 191 Dutton Ave., Buffalo 11, N. Y.

Loom Motor

Rotor design permits motor to drive the loom throughout entire picking cycle.

Hour-glass construction of this new loom motor permits use of the unit as replacement for the older style loom motor of less hp. capacity and for converting group-driven looms to individual motor drives without the necessity for extensive modification. Outstanding features include the heavy duty, factory-lubricated ball bearings securely locked in place. Reduction of cyclic peaks of power without the use of external

Money-Saving Tip from *Kalamazoo*

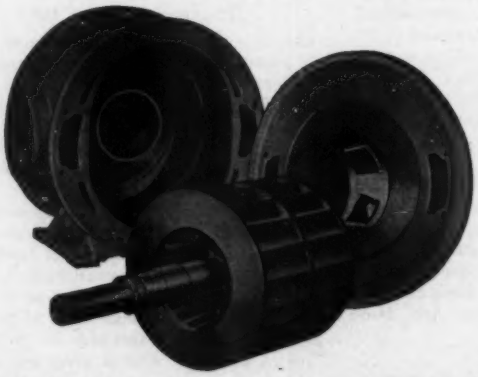
"LINE OLD TANKS WITH KALAMAZOO GLAZED TILE"

It isn't always necessary to replace old concrete tanks that are pitted and letting sand get in your stock. Such tanks make an ideal base for Kalamazoo Glazed Tile. Gives you a "new" tank *at low cost* that will last for years and years without attention. Tile lets you modernize your chests and improve agitation with midfeathers and rounded corners. Write for full particulars—no obligation, of course.

Kalamazoo TANK and SILO COMPANY

727 HARRISON STREET KALAMAZOO, MICHIGAN

SIMPLICITY



NASH VACUUM PUMPS HAVE ONE MOVING PART

Operating advantages made possible by the Nash principle, and present in no other type of vacuum pump, permit a new level of operating economy. Nash Vacuum Pumps have but one moving part, a rotor cast in one piece, and revolving without metallic contact. There are no valves, no pistons or sliding vanes, no internal parts requiring wear adjustment or lubrication.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

National defense depends in a million ways upon the unfailing response of very small wires in naval and field artillery. In like manner, thorough-going care with reference to every strand of wire is indispensable to the manufacture of quality Fourdrinier wire cloth.

THE LINDSAY WIRE WEAVING COMPANY
14001-14299 Aspinwall Avenue • Cleveland 10, Ohio

Lindsay WIRES

flywheels is said to have been achieved, as well as use of a relatively high slip design which dampens vibration and reduces whip of the crankshaft. Louis Allis Co., Milwaukee 7, Wis.

New Product Briefs . . .

▶ Flame Failure Safeguard—Fireye System FF-1 provides flame failure protection for commercial gun type light-oil burners. In event of light off failure, lock-out will occur 5 sec. after power has been applied to burner motor and electric ignition. This system consists of photoelectric scanner Type 45PH5 and programming control Type 24PJ8. Combustion Control Corp., 77 Broadway, Cambridge 42, Mass.

▶ Coupling—Designed primarily for engine drives and applications involving severe torque fluctuations. Improvement in rubber composition and bonding increase torque capacity 20 per cent above previously published values while the hubs and adaptor plates have been redesigned. The Falk Corp., Milwaukee 8, Wis.

▶ Water Control—Electrical control designed as a safety device to protect water-cooled, electrically-operated equipment, such as air compressors, vacuum pumps and the like, against damage through water failure. Can be adjusted to operate at any water flow the equipment requires. Electro Chemical Supply & Engineering Co., 750 Broad St., Emmaus, Pa.

▶ Floor Lock—For portable elevators, conveyors and floor trucks. Features a leaf-type treadle for instant, positive locking and release action. Constructed of steel and arc-welded. The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.

▶ Motor Control—Full or reduced-voltage synchronous motor control units for operating and protecting all types of synchronous motor drives. Supplied as factory-wired units, requiring only external connections when installed. Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

▶ Positioning Locknuts and Lockwashers—Specially designed for effectively locking the various makes of ball and roller bearings in correct position on shafts of 5/16 to 7 11/16 in. dia. Claimed precision manufactured to A.B.E.C. and S.A.E. standards, easy to install and remove, rust-resistant, vibration proof, smooth, and burr-free. Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.

▶ Polyethylene-Lined Drums—To facilitate use of acid-resistant polyethylene coatings sprayed by the Schori flame spray pistol these Hackney open head seamless barrels in 30- and 50-gal. capacities are available. Schori Process Div., Ferro-Co Corp., 8-11 43rd Rd., Long Island City 1, N. Y.

▶ Fire Hose—Hose is claimed 12 to 15 per cent lighter, and 50 per cent stronger under a 600 lb. test than standard hose tested at 400 lb. Also, hose is more flexible, easier to handle and coils into a smaller diameter than standard constructions. Not affected by mildew, mild acid or alkalis. The B. F. Goodrich Co., Akron, Ohio.

▶ Solenoid Valves—Employ small solenoids traveling through only an 1/8 in. stroke to move a small pilot valve plunger to apply air to the operating piston to move the main valve plunger back and forth. When the solenoid is deenergized the pilot cylinder is exhausted through the small pilot valve. Especially suited for use with certain production welders and other high cycle machine requirements. C. B. Hunt & Son, Inc., Salem, Ohio.

▶ Gas Electric Power Units—Used in electric industrial truck operations such as 4000 lb. fork trucks, 10,000 lb. platform trucks, and 6,000 lb. crane trucks. Employs tubular flange type, flexible "Lord" engine mountings to eliminate strains being transmitted from frame of the unit to engine with resultant breakage and oil leaks, and a flexible oil drain line. Ready-Power Co., Detroit, Mich.

▶ High-Lift Truck—By increasing length of truck's telescoping uprights the lift on this truck can be raised to 22 feet above the floor, stacking newsprint rolls four-high. Standard size rolls are 40 in. dia., 66 in. long, weigh 1800 lb. Elwell-Parker Electric Co., Cleveland, Ohio.

▶ Hand Hoists—Made in capacities from 1/2 ton to 4 tons, these hoists are compact, close headroom, lightweight and easy to handle in tight places, and consist of modern gear drive, Weston type brake, steel load chain, steel housing, self-lubrication, and drop forged top and bottom hooks. Wright Hoist Div., American Chain & Cable Co., Inc., York, Pa.

▶ Tramrail Trolley—For use on hand or electric powered tramrail systems, transfer bridges, and tramrail cranes. Drawbar pull on heavier capacity trolley after normal break-in period is said to be reduced to 15 lb. per ton to start the load rolling and 10 lb. per ton to maintain momentum. Trolley is a four-wheel unit with a 16-in. wheelbase. The Forker Corp., 2122 Random Rd., Cleveland 6, Ohio.

▶ Polyamide Resins—New suspensoids are opaque white, water suspensions available in semi-commercial quantities, and are used as heat sealing adhesives and as water-vapor resistant coatings for paper, plastic films and metal foils. General Mills Research Laboratories, 2010 E. Hennepin Ave., Minneapolis 13, Minn.

▶ LIGHTING TRANSFORMERS — Redesigned, improved line of dry type general purpose lighting transformers permit greater circulation of air through and around the transformer resulting in lower operating temperatures. Available knock-outs have been increased to facilitate wiring of either an individual transformer or three units used in a three phase. Marcus Transformer Co., Inc., 32-34 Montgomery St., Hillside 5, N.J.

▶ OPTICAL MEASURING INSTRUMENT—For inspection of smal parts or small dimensions on large parts, the Pocket Comparator embodies a new principle by permitting the user to compare through a magnifying lens the part to be checked against a finely calibrated pattern or reticle. Checks linear measurements, circles, angles, radii, etc. National Tool Co., 11200 Madison Ave., Cleveland 2, Ohio.

▶ FLOOR MAGNET—Long low-clearance handles of Series D, Rotary Floor Magnetools permit operator to pick up steel chips from under places not previously possible, without stooping. Unit is propelled carpet-sweeper fashion, a powerful magnetic tube rotating with the wheels. Magnets are permanent, not electric, and are sealed in a tube. Multifinish Mfg. Co., Detroit 7, Mich.

▶ ACCELERATING RELAY—Improved voltage-type accelerating relay is particularly applicable where adverse atmospheric conditions exist or where it is desired to have remote control which can be incorporated into an explosion-proof case. Voltage principle eliminates voltage drop at motor terminals usually encountered with current-type relays. General Electric Co., Schenectady 5, N. Y.

▶ SPEED CHANGERS—Gear reductions as high as 750,000 to 1 are now practical and available in the Metron line of miniature speed changers. Provides several hundred ratios between 1000:1 and 750,000:1 in addition to (500 or more) standard 1, 2 and 3 section units. Metron Instrument Co., 432 Lincoln St., Denver 9, Colo.

▶ HIGH-CAPACITY BELT—Super 7 Textrop belt is oil-resistant with a 40% higher rating than the standard belt, and maintains the same stretch characteristics and has the same safety factor margin. This belt can be made static resisting. Allis-Chalmers Co., Milwaukee, Wis.

Animal Glues . . .

(Continued from page 433)

there is a minimum of absorption into board of paper, the glue sets fast by cooling, and a high concentration of solids is enabled. Also, this glue allows exceptional smooth machining properties, forms a continuous film, gives freedom from crystallization, and is compatible with a wide range of plasticizers. It will stand much handling abuse, has a low water content, allows a rapid formation of strong initial bond, can handle high speed hand or machine operation, and holds to a wide range of packaging materials.

Some disadvantages are present. It must be used hot, and cannot hold to paraffin, waxed surfaces, varnished or pyroxylin coated materials. Animal glues are unsuitable for excess moisture or refrigeration conditions, and some animal glues have odors. While there is a fast set, which is not advantageous in intermittent operations, there is a time loss while awaiting melting or heating up. The bond strength is often in excess of requirements and animal glues cost more than many starch and dextrine adhesives.

I have attempted to show how animal glue is a very versatile base, from which we compound many of our finished adhesives. It has many advantages and some drawbacks. Whether we use animal glue as a base for some particular adhesive depends a good deal on the adhesive chemist carefully weighing its properties against the properties of other types of adhesives such as you heard here tonight.

Cut Steam Costs 2 Ways! with Stickle Vacuum Differential Drainage

Applied to your driers, Stickle Vacuum Differential Drainage will:

1 Rapidly remove air and condensation—increasing production efficiency.

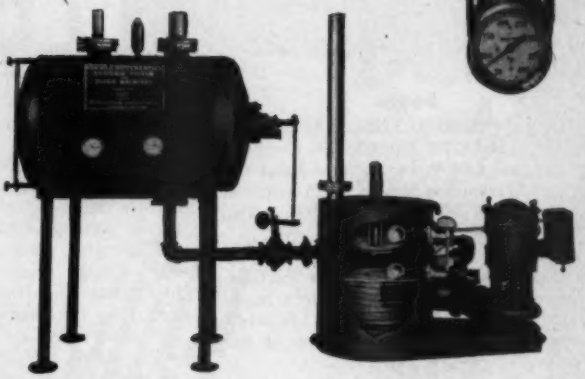
2 Return condensate to your boilers at maximum temperature—saving 10-15% of your fuel.

Whether your machines operate at above-atmosphere pressures or at 15 inches of vacuum, proper drainage is assured. Pressure changes require only simple resetting of pump controls. But that's not all! Stickle Differential Drainage provides positive, uninterrupted circulation of steam—cuts volume of cooling water 75%!

Stickle Drainage Systems contain few working parts—no close clearances to wear—are simple and rugged in design to assure long, trouble-free service. Why not investigate their application to *your* plant? Make the most of your steam—earn the most for your mill—with STICKLE!

Stickle Steam Specialties Company
2215 Valley Avenue — Indianapolis, Indiana

Right: Stickle Micro Adjustable Orifice with Indicating Thermometer. Provides visual operation, needlepoint regulation of condensate flow. Key-lock and shield prevent unauthorized change.



Above: Flash Tank and Pumping Unit of Stickle Vacuum Differential Drainage and Boiler Return system.

FREE! Complete cost-cutting equipment for paper mills, clearly cataloged and generously illustrated. Ask for Stickle Bulletin Nos. 160 and 160A. Write today!

STICKLE EQUIPMENT

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BARNEY BENSON — PAUL FOSTER
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Lindsay & Niagara Wires
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Siamese & Richland Dryer Felts
Carrier Rope
Splicing Tissues
Deckle Webbing
Etc.

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Federated first for Lead Products

Asarco Sheet Lead ... All commercial weights and sizes. Chemical ... Tellurium Chemical ... Antimonial.

Asarco Lead Pipe ... All commercial sizes. Special sizes on request. Chemical ... Tellurium Chemical ... Antimonial.

Asarco Lead and Lead Lined Valves ... Split Type "Y" and "Angle", Standard "Y", Gate, Check, Hard Lead "Y", Plug and Seat.

Asarco Lead Fittings ... Elbows, Crosses, Tees, "Y's", (with plain ends, with flanges on, or for flanging in the field). Chemical and Antimonial.

Asarco Lead Wool ... 5/8" rope in 50 lb. waterproof bags.

Asarco Lead Specialties ... Extrusions and Castings to specification.

See Federated also for Lead Lined Pipe Lead Lined Fittings, Lead Lined Flanges

Federated Metals Division
AMERICAN SMELTING AND REFINING COMPANY, 120 BROADWAY, NEW YORK 5, N. Y.

The Paper Industry New Literature

Books

THE LAW AND PRACTICE RELATING TO SAFETY IN FACTORIES. Compiled and published by International Labor Office, Washington Branch, 1825 Jefferson Place, N.W., Washington 6, D.C. 6x9¼. 1701 pages. $8.50.

This volume is the result of a request made in 1939 to the governing body of the International Labour Office to prepare a Model Code of Safety Regulations for Factories; data presented is the compilation of that study.

In a short introduction, the known causes and frequency of industrial accidents in the 14 nations studied in the volume are related, with illustrative tables and summarization of data. The nations considered include seven European countries (including Soviet Russia), four American nations, one Asiatic country, one African country, and one example from Australasia.

The general plan of the book is a division into two parts, with Part I comprising National and International Organization, and Part II dealing with Legislation. Each part is further divided into nations, and specific industry safety organization and legislation in each nation.

The paper and pulp industry is the subject of Chapter XI, wherein regulations in various countries are outlined. Additionally, many of the incidental or individual hazardous tools or work discussed are of definite application to the industry. An elaborate cross-index points up other applications in the industry which are not extensive enough to be listed in the elaborate table of contents.

An extensive bibliography of suggestions and regulations concerning factory safety published in each of the fourteen countries studied in the survey completes the book.

PRODUCTION IN ADVERTISING. By David G. Hymes. Published by Colton Press, Inc., 468 Fourth Ave., New York, N.Y. 5½x8. 392 pages. $5.00.

This volume, a very complete yet concise treatment on production, is offered as a textbook for students of the graphic arts, advertising, journalism, publishing or printing, but would be equally valuable as a refresher for the person experienced in any of those fields.

Each phase of production work is covered thoroughly, with diagrams or sketches where necessary, and a complete glossary of terms at the end of each chapter or section. In chapter subdivisions of Advertising Art, Photoengraving, Typography, Duplicate Plates, Ink, Printing, Binding and Die Cutting, Campaign Production, and Paper, virtually all elementary knowledge of each component part is included.

The chapter on advertising art, for instance, includes detailed instructions on scaling photographs for size; the section concerning typography includes an extensive list of known type faces as well as comprehensive character-per-pica tables; the chapter on printing relates in considerable detail the various printing techniques available.

A 40-page chapter on paper discusses basic weights and sizes, with typical finishes, and tables clarifying the discussion; manufacture of paper is outlined with reference to machinery and terminology; suggestions are made for the best use of each variety of a lengthy list of paper types; factors of good paper are explained, with the visible proof of the presence of those factors discussed. This section on paper is related to the chapter on inks, which discusses the best ink for certain paper types and desired results.

Written in an easily understood style, Mr. Hymes' book follows the production procedure chronologically from beginning to end, suggesting and advising, relating new mechanical and stylistic developments in each phase of work discussed. All usual editorial features, such as cross-indexing and definitions, are present.

PULP AND PAPER MACHINERY SPECIALTIES. Published by The Sandy Hill Iron & Brass Works, Hudson Falls, N.Y. Albumtype, simulated leather and plastic bound. 11 x 14 in.

Dedicated to the pulp and paper industry, this brochure comprises 21 sections with each of Sections 2 to 21 devoted to individual equipment manufactured by The Sandy Hill Iron & Brass Works, its associates, Newport News, Canadian Vickers, and affiliated foreign companies. Section 1 lists the machinery and services available from the company.

Fan-fold pages in several sections show schematic diagrams of complete newsprint, cylinder, all purpose fourdrinier, and tissue machines. An outline of the special features of each machine is given. Photographs throughout the brochure help make it an interesting and outstanding piece of literature.

PUMP QUESTIONS AND ANSWERS. By Roy Carter, Igor J. Karassik, and Elliot F. Wright. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N.Y. 346 pages. $5.00.

This manual contains 669 everyday questions and answers on construction, application, operation, installation and maintenance of pumps. It also serves the purpose of a trouble-shooting manual, for help when a pump fails to discharge, when it is noisy, or wears rapidly, etc.

Five major sections treat, respectively, centrifugal, vertical turbine, regenerative, rotary, and reciprocating pumps. Each of the first four sections opens with a general description of a specific type of pump, its parts, and materials used in its construction, and concludes with a thorough treatment of pump troubles, symptoms, and causes, followed by a chapter on priming.

In the section dealing with reciprocating pumps, two chapters are given to the construction of simplex and duplex direct-acting pumps and horizontal and vertical power pumps, respectively.

An entire chapter has been devoted to the design and operation of the reciprocating-pump liquid valves; similarly, another is devoted to the description of red, piston, and plunger packing; and another to analysis of cushion chambers.

Answers to the questions are made doubly clear with numerous page-size diagrams, photographs, charts, and tables.

Booklets and Pamphlets

SAFETYGRAPH. Published by National Safety Council, 425 No. Michigan Ave., Chicago 11, Ill. 12 pages. This visual aid for training small groups in safety practices shows why falls are one of the more serious industrial accident hazards, how such falls occur, and how they may be prevented. The booklet opens to form an easel; a safety talk for the instructor is printed in large type on the reverse of each page, and pages facing the audience are composed of cartoons and photographs.

TWENTY PAPER TESTING PROCEDURES. Published by the Packing Institute, 342 Madison Ave., New York 17, N. Y. 25c per procedure to non-members of Packaging Institute, one copy free to each member. Thirty-one TAPPI testing procedures have been adopted after review by the Paper Testing Committee found them satisfactory for the packaged products producer; the second group of twenty papers is now available, and others will be published soon.

URAC 180 RESIN ADHESIVE. Published by American Cyanamid Co., Plastics Dept., 30 Rockefeller Plaza, New York 20, N. Y. 8 pages. This booklet describes the advantages of using URAC 180 resin adhesive, a high-solids resin, in hot or cold plywood pressing, veneer bonding, lumber-core gluing and high frequency wood bonding. Versatility, stability, and quality-bond features of the resin are considered.

MANAGEMENT OF INDUSTRIAL RESEARCH. Published by Arthur D. Little, Inc., Cambridge 42, Mass. 20 pages. This selected and annotated bibliography was prepared

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Ready for the finest of castings.

"TAPPING A BATCH"

Every batch that goes into a Chief Sandusky Centrifugal Casting is of the same high quality. Virgin metals and composition ingot of the highest quality available are always used. Close control of melting atmospheres with accurate pyrometric control of temperature insure uniform, top grade alloys.

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- The biggest water users of the nation agree that Layne Well Water Systems and Layne Vertical Turbine Pumps have more good features than any other make. They are more rugged in construction, heavier in production—and cost less to operate, giving years and years of service for the original installation cost. There is a size for every need, custom built for any depth setting. For catalogs or more information address

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WELL WATER SYSTEMS
VERTICAL TURBINE PUMPS

originally for use by members of the Little organization in the management of research programs, and includes thorough reports on references listed and a good summary of research objectives. Short chapters are devoted to organization of a research program, control methods, technical and technical-economic research programs, and the research laboratory. Cross-indexed.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Materials Handling Equipment. Tobey Mfg. Corp., 1221 El Segundo Blvd., El Segundo, Calif.—4-page bulletin describes trucks, dollies, pallets and the Stak-Rak. Illustrated with photographs of equipment.

Speed Reducers. The Falk Corp., Milwaukee 8, Wis.—Bulletin 1110 contains engineering data on Falk Parallel shaft units which simplifies the procedure confronting an engineer when using the firm's product bulletins.

Condensers. Condenser Service & Engineering Co., Inc., Hoboken, N.J.—28-page Bulletin No. 441-C describes and pictures condensers for different applications. Emergency requirements, service and maintenance are discussed. Condenser tube data, pressure-temperature conversion tables, curve chart are included.

Valves. Edward Valves, Inc., East Chicago, Ind.—4-page Bulletin No. 501 gives design details, dimensional data, material specifications, and list prices for the new forged steel valve series of globe and angle stop valves. Includes pictures.

Fork Truck System. The Yale & Towne Mfg. Co., Philadelphia Div., Philadelphia 15, Pa.—4-page Bulletin describes and illustrates with pictured applications the Pak-Loader fork truck system of palletless handling.

Generators. General Electric Co., Schenectady 5, N.Y.—8-page two-color Bulletin GEA-5415 deals with generators for standby, portable, and prime source power in widespread fields of application. Includes illustrations, three typical installation stories, and tells about construction features, mechanical modifications, and performance data.

Transparent Films. National Adhesives, 270 Madison Ave., New York 16, N.Y.—18-page booklet with chart gives details of general types of adhesive formulations for bonding transparent films, proper handling methods, and some problems encountered in obtaining good adhesion. Chart contains more than 38 different trade names of transparent films, and includes the names and addresses of the manufacturers of these products.

Sales Control System. Remington Rand, Inc., 315 4th Ave., New York 10, N.Y.—4-page folder identified as KD 539 describes two modern record systems designed to keep management in close control of sales development. One is the Prospect Development and Service Followup Visible Record System which requires a minimum of time for checking and posting, and the other is Prospect Record Folder system, for those who prefer a record requiring no transcriptions.

Bladeless Impeller Pump. Fairbanks Morse & Co., 600 So. Michigan Ave., Chicago 5, Ill.—16-page Bulletin 5400K-1 describes and illustrates with photographs a bladeless sewage and trash pump. Details of construction with cut-away views, and dimensional drawings and tables are given.

Sheet Packing. The B. F. Goodrich Co., Akron, Ohio—4-page Catalogue Section 5000 lists specifications and outlines uses of the different kinds of sheet packing for handling liquid, gases and abrasives. Materials used in construction are described.

Floor Resurfacing Problems. United Laboratories, Inc., 16801 Euclid Ave., Cleveland 12, Ohio—3-way folder describes 4 general types of materials for renewing old floors. Conditions under which each type of material should be considered are outlined.

Centrifugal Dryer. McNally Pittsburg Mfg. Corp., Pittsburg, Kans.—4-page Bulletin No. 1149 describes and illustrates the continuous centrifugal fine coal dryer. Installations photographs are shown.

Pressure Filter and Filter Media. T. Shriver & Co., Inc., 810 Hamilton St., Harrison, N.J.—Two 4-page bulletins, Nos. 132 and 133, describe and illustrate filter cloths and papers, and enclosed type-horizontal plate pressure filter, respectively. Sectional view of the filter unit, and specifications are included.

Oil Hardening Tool Steel. Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill.—2-page leaflet describes the Ry-alloy ground flat stock used for making templates, jigs, gauges, fixtures, stamps, machine parts, tools, dies, etc. Sizes in stock and prices are listed.

Sectional Conveyor. Robins Conveyors Div., Hewitt-Robins, Inc., Passaic, N.J.—4-page Bulletin No. 132 gives an illustrated description of the sectional conveyor, and briefly describes four vibrating screens.

Flow Gauge. Fischer & Porter Co., Hatboro, Pa.—4-page Catalogue No. 96 illustrates and describes the redesigned Magna-Sight flow gauge for coolants, lubricants, opaque liquids, slurries and other fluids. Includes sectional views, dimensions, flow rate and pressure data and specifications.

Hydrogen Peroxide Solutions. Buffalo Electro-Chemical Co., Inc., Buffalo, N.Y.—New booklet describes hydrogen peroxide solutions of 27.5%, 35% and 50%. Included are a compilation of physical data and properties, a list of reactions in organic and inorganic chemistry, applications, and uses.

Synchronous Motors. General Electric Co., Schenectady, N.Y.—8-page Bulletin GEA-5426 describes the high speed synchronous motors, lists some applications, gives three typical installation stories, and discusses construction features, mechanical modifications, and direct-connected exciters for the motors. Illustrated.

Motor Selector. Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.—4-page Small Motor Selector discusses factors to be considered in selecting the right motor. Center pages which open to form a large chart present in tabular form the various types of small motors, together with complete data concerning hp. range, speed characteristics, torque, reversibility, bearings, mountings, and application.

New Chemicals. New Products Development Dept., American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N.Y.—Bulletin entitled "Collective Volume I" contains a compilation of data on several new chemicals that are now available, some of which are Aryl Biguanides, Guanylurea Salts, Beta Chloropropionitrile, Dialkyl Cyanamides, Glycolonitrile, Lactonitrile, Succinonitrile, and Potassium Cyanate.

Water Treating. Graver Water Conditioning Co., 216 W. 14th St., New York 11, N.Y.—12-page booklet is a paper on water softening by hydrogen zeolite, presented at the Tenth Water Conference of the Engineers' Society of Western Pennsylvania at Pittsburgh. Applications of acid-regenerated zeolites are explained. Tables of results obtained and charts showing characteristics of zeolites are included.

Chemical Resistant Coatings. The Wilbur & Williams Co., Greenleaf and Leon Sts., Boston 15, Mass.—4-page folder contains information on applications for maximum chemical, moisture and rust resistance in varied industries for all metal, concrete and wood.

Oilless Wooden Bearings. Paramount Oilless Bearing Co., Worcester, Mass.—Engineering manual treats the principles and applications of oilless wooden bearings in modern machine design, and considers application of wood bearings in certain fields where no other type can serve so satisfactorily or efficiently.

Bronze Bars. National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.—6-page bulletin lists sizes and weights of cored and solid "Tiger" bronze bars, shows the physical properties of the bronze and describes uses and advantages of this wear and shock resistant, antifrictional material. Illustrated.

Heat Exchanger. Condenser Service and Engineering Co., Inc., Seaboard Trust Bldg., Hoboken, N.J.—22-page bulletin describes the heat exchanger design most widely used for liquid to liquid heat transfer in such applications as cooling diesel engine lube oil, jacket water, quench oil, and gear, turbine and transformer oil. Illustrated with installation photographs, sectional views, and engineering data.

Water Conditioning. General Filter Co., Ames, Iowa—12-page Bulletin No. 948 describes the Cascade, Coke Tray, and Steel Coke Tray aerators, and includes such factors as oxidation, odor and taste removal, and separation of gases from liquids. Cut-away line drawings show construction details. Processes are explained in theory. Illustrated with photographs.

Explosion-Proof Motors. 2-page Bulletin No. C-130 describes and illustrates three classes of explosion-proof motors for application in locations where gasoline, oil, naphtha, alcohols, acetone, lacquer solvent vapors and natural gas are present. Details of motor construction are featured.

Water Screens. Chain Belt Co., 1600 W. Bruce St., Milwaukee, Wis.—12-page Bulletin No. 50-36 describes the complete line of Rex traveling water screens used in power plants, paper mills, water treatment, etc., wherever a continual supply of clean water is necessary. Photographs show the screens available and details of construction.

Measurement Instruments. Fischer & Porter Co., 76 County Line Rd., Hatboro, Pa.—8-page Catalogue 76 illustrates and describes the Pycnorator instruments for measurement and control of fluid density and specific gravity. Schematic diagrams are shown.

Alloy Castings. Cooper Alloy Foundry Co., Hillside, N.J.—3-way folder is an alloy reference chart containing a comprehensive analysis of stainless, corrosion and heat resistant alloy castings. Properties of these alloys at room temperature and in high temperatures, and applications in detail, are given.

Protective Equipment. General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 32 Pa.—46-page catalogue entitled "Everything in Safety" covers respiratory devices, eye protection, hats, gloves, carboy pumps, drum pumps and miscellaneous industrial safety equipment for use in industries. Includes price list. Illustrated.

Instrument Mount. Eberbach & Son, Co., Ann Arbor, Mich.—1-page Bulletin No. 160-111-49 describes and pictures an instrument base for mounting delicate instruments to stop damage caused by vibration. Cross section of shock absorbing mount is shown.

Riveted Roller Chains. Baldwin-Duckworth Div., Chain Belt Co., Springfield 2, Mass.—8-page Bulletin No. 50-6 describes and illustrates the riveted roller chain assembly. Tables and examples are provided showing suggested combinations of units for various length

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drives. Included are construction diagrams, illustrations, list prices, specifications and dimensions.

Twin Shell Binder. Patterson-Kelley Co., Inc., East Stroudsburg, Pa.—4-page Catalogue Section 401 describes and illustrates the P-K twin shell binder for mixing and blending dry materials.

Locknuts and Lockwashers. Link Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.—4-page Folder Number 2348 contains dimension data on bearing-positioning locknuts and lockwashers, designed for locking various makes of ball and roller bearings on shafts of 5/16 to 7-11/16 in. dia. Illustrated.

Dust and Fume Suppressors. Whiting Corp., Harvey, Ill.—Two 4-page bulletins describe and illustrate the wet-type Hydro-Clone dust and fume suppressors. FY-162 describes the vertical type, and FY-165 the horizontal type. Dimension tables and installation photographs are included.

Valve Selection Chart and Bulletin. Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamilton, Ohio—Chart and 20-page Bulletin No. 148 aids in determining proper sizes of valves. Chart indicates which valves are suitable for dead-end service and which are not. Bulletin contains descriptive data on reducing valves, and is illustrated with diagrammatic sketches and photographs. Prices, weights and dimensional tables are included.

Pumps. De Laval Steam Turbine Co., Trenton 2, N. J.—12-page Bulletin No. 1100 contains description of stock, liquor and white water pumps. Illustrated with installation photographs, and schematic sketches.

Micarta. Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.—36-page Micarta data book (B-3184-D) contains grades and forms in which Micarta is supplied, together with the chemical, mechanical and electrical properties of each. Standard shapes and sizes available are listed, and a description of finishes is included.

Heat Exchanger and Condenser Tubes. The Babcock & Wilcox Tube Co., Beaver Falls, Pa.—Bulletin TB-329 concerns economical choice of appropriate tubing for specific service conditions in heat transfer units and for easy fabrication in heat exchanger apparatus. Specifications and data table on carbon, low chromium, intermediate chromium, nickel and stainless steels, is included.

Reference Table. The Babcock & Wilcox Tube Co., Beaver Falls, Pa.—Linear conversion table is a reference for engineers who wish to convert inches and fractions of inches into decimal parts of a foot. It is suitable for many purposes in addition to those encountered in the application of steel tubing.

Flash Butt Welding. The American Welding & Mfg. Co., Warren, Ohio—20-page booklet shows advantages of flash butt welding by controlled techniques and typical product applications. Products and subassemblies ranging in size from 4 to 100 in. in dia. and up to 16 mi. in length are described.

Air Diffuser Manual. Anemostat Corp., of America, 10 E. 39th St., New York, N. Y.—68-page Selection Manual contains a selection chart showing photographs and characteristics for 13 different diffuser types. 30 pages are devoted to details on various types of diffusers, 18 pages cover accessories, volume control, specifications, and installation information, and the last ten pages treat such subjects as anemotherm air meter, special diffuser applications, typical installations, etc.

Magnetic Separators. The Bauer Bros. Co., 1759 Sheridan Ave., Springfield, Ohio—4-page, 3-color Bulletin No. M-3-A describes Triple-Air-Gap and Single-Air-Gap separators for chutes; magnetic grates for hopper bottoms and floor openings; and portable separators for conveyor belts and picking tables. Unique features explained and complete data given.

Electrostatic Precipitation. General Electric Co., Schenectady 5, N. Y.—16-page, 2-color Bulletin No. GEA-5212 explains how electrostatic precipitation works, gives case histories of 7 typical installations, and describes the various methods and electric equipment applicable to each method. Illustrated with photographs and diagrams.

Protective Coatings. The Atlas Mineral Products Co., Mertztown, Pa.—8-page Bulletin No. 7-1 contains information on coatings suitable for protection against corrosive fumes or splash on steel, concrete, and wood surfaces.

Steel and Alloy Plate Fabrication. Nooter Corp., 1400 S. Second St., St. Louis 4, Mo.—16-page Catalogue No. 150 presents a pictorial story of the fabrication of steel and alloy tanks and pressure vessels. Comprehensive corrosion data charts are included.

Corrosion Resisting Linings. Carboline Co., 7603 Forsyth Blvd., St. Louis 5, Mo.—Bulletins C-6A and C-7 contain descriptions and complete instructions for application of lining of wood and steel storage and process tanks for handling corrosives.

Soot Blowing Systems. Vulcan Soot Blower Corp., Dubois, Pa.—16-page illustrated Bulletin describes automatic-sequential power-operated soot blowing systems. Operating procedures are discussed in detail, and ten typical installations are shown diagrammatically.

Centrifugal Pressure Drop Unit. Bird Machine Co., So. Walpole, Mass.—3-way folder describes and illustrates Dirtecs, an effective means of removing dirt from paper stock. Flow diagrams are included.

Rubber Linings. The B. F. Goodrich Co., Akron, Ohio—8-page Catalogue Section 9780 discusses rubber-lined pipe, fittings and valves as to design, construction and service recommendations, and uses. Included are pictures and descriptions. Specifications and data are listed.

Plastic Tubing. U. S. Stoneware Co., P. O. Box 350, Akron 9, Ohio.—24-page Bulletin No. T-77 gives complete information on all formulations of Tygon plastic tubing—its uses, properties and chemical resistant characteristics. Photographs showing applications are included.

Automatic Steam Generators. Edge Moor Iron Works, Inc., Edge Moor, Del.—8-page Bulletin G-491 describes and illustrates steam generators. Illustrated with pictures, flow diagram, and specifications and dimensional table.

Organic Chemicals. Glyco Products Co., Inc., Brooklyn, N. Y.—Four catalogues describe all products manufactured by this company, and are entitled "Esters by Glyco," "Synthetic Waxes by Glyco," "New Products for the Food Industry by Glyco," and "'Aqualized' Vegetable Gums." Each gives chemical, physical and application data.

V-Belt Drives. Allis-Chalmers Mfg., Co., Milwaukee, Wis.—4-page inventory survey check list contains suggestions to help users determine the exact condition of their V-belt drives, and is designed to cover the drive problems in most plants.

Chemicals. C. Tennant, Sons & Co., Empire State Bldg., New York, N. Y.—Three technical data sheets describe Ammonia alum, potash alum, and aluminum sulphate (iron-free). Samples are available with sheets.

Fork Lift Trucks. The Buda Co., Harvey, Ill.—4-page bulletin gives specifications, and general data on two models of fork lift trucks. Illustrated with pictures of the units and their applications.

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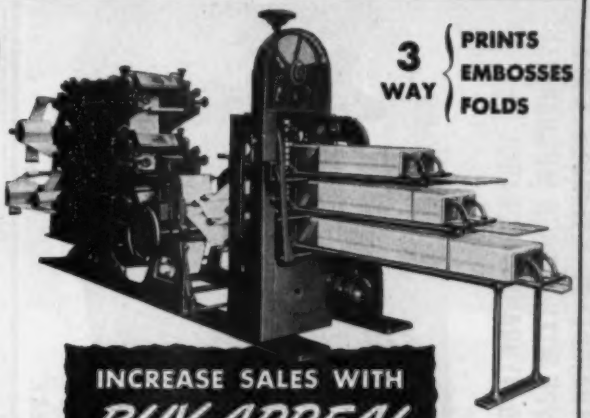

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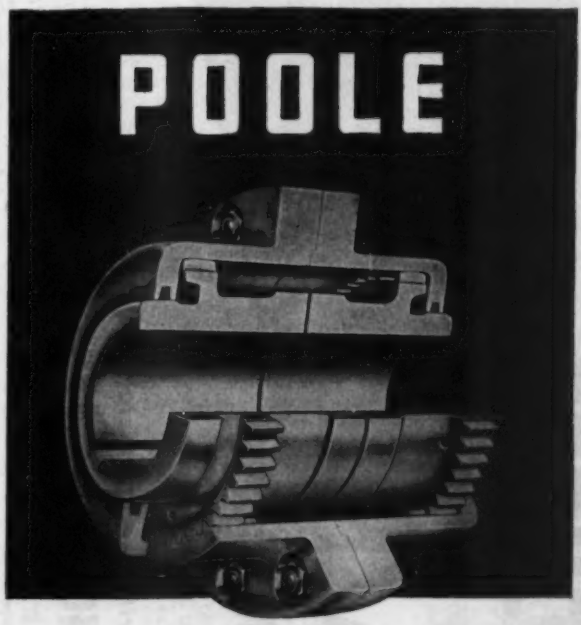

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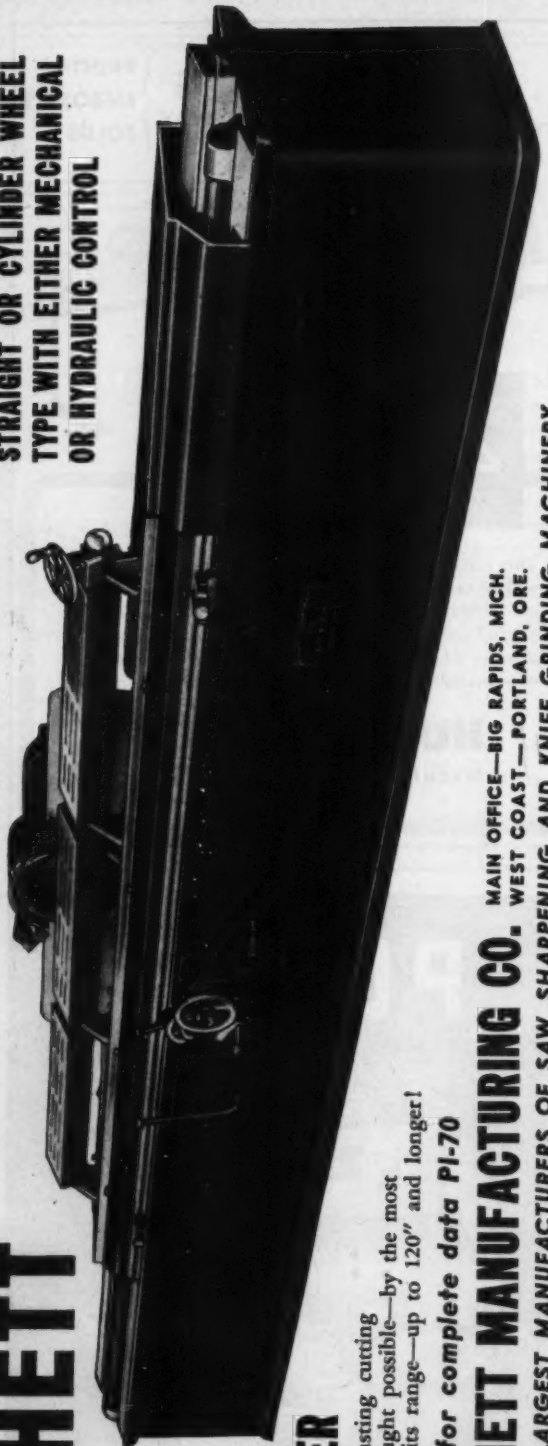

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Percales	6.25 to 6.50
Light Prints, No. 1	6.00 to 6.25
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Bleachable	4.50 to 4.75
Unbleachable	4.00 to 4.25
New White Canvas	11.50 to 12.00
New Mixed Blacks	3.50 to 3.75
Canton Flannels, Bleached	10.75 to 11.00
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New White No. 1	11.25 to 11.75
White Shrunk	10.50 to 10.75
Silesias No. 1	7.50 to 7.75
New Unbleached	11.25 to 11.75
Fancy	5.25 to 5.50
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No. 2	1.20 to 1.30
No. 3 and No. 4	1.00 to 1.10
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Repacked	2.50 to 2.75
Thirds and Blues—	
Repacked	2.25 to 2.50
Miscellaneous	1.75 to 2.00
Whites, No. 1—	
Repacked	4.25 to 4.50
Miscellaneous	3.00 to 3.25
White, No. 2—	
Repacked	3.00 to 3.25
Miscellaneous	2.50 to 2.75

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ex dock New York City

NEW RAGS

	per cwt.
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RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens No. 2 White Linens No. 3 White Linens No. 4 White Linens No. 1 White Cottons No. 2 White Cottons No. 3 White Cottons No. 4 White Cottons Extra Light Prints Ord. Light Prints Med. Light Prints Dutch Blue Cottons French Blue Cottons French Blue Linens Checks and Blues Linsey Garments Dark Cottons Old Shopperies	Nominal

ROPE and BAGGING

f.o.b. and ex dock New York City

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Gunny No. 1—	
Foreign	5.50 to 5.75
Domestic	6.25 to 6.50
Wool Tares—	
Light	6.50 to 7.00
Heavy	7.00 to 7.50
No. 1 Scrap Bagging	5.00 to 5.25
Manila Rope—	
No. 1 large	5.50 to 5.75
No. 1 small	4.50 to 4.75
Sisal Rope—	
No. 1 large	5.00 to 5.25
No. 1 small	4.50 to 4.75
New Burlap Cuttings	6.75 to 7.25
Jute Threads—	
Foreign (Nom.)	6.50 to 7.00
Domestic	6.00 to 6.50
Strings—	
No. 1 sisal	4.50 to 4.75
No. 2 sisal	4.00 to 4.25
Soft jute	4.25 to 4.50
Mixed	2.50 to 2.75

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Soft White, Misc.	60.00 to 65.00
Fly Leaf, No. 1	30.00 to 32.50
Fly Leaf, Woody No. 1	22.50 to 25.00
No. 2 Mixed Col. Woody	17.50 to 20.00
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	24.00 to 25.00
Mixed Books	12.00 to 13.00
Ledger Stock—	
No. 1 White	45.00 to 50.00
No. 1 Mixed (Colored)	32.50 to 35.00
Manilas—	
New Env. Cuttings	60.00 to 65.00
New Env. Cuts, One-Cut	—
Extra Manilas	35.00 to 40.00
Manila Tab Cards, Free of Ground Wood	65.00 to 70.00
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Kraft—	
New Envelope Cuttings	60.00 to 65.00
Tripled Sorted No. 1 100%	30.00 to 35.00
New 100% Cor. Cuts	30.00 to 35.00
No. 1 Old Assorted	25.00 to 27.50
News—	
White Blank	55.00 to 60.00
Overissue	16.00 to 17.00
No. 1 Folded	11.00 to 12.00
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Ground, cwt.	3.80—
Powdered, cwt.	4.20—
Blanc Fixe—	
Pulp, bulk, ton	80.00—
Dry, barrels	85.00—
Bleaching Powder—	
Drums, cwt.	4.50 to 5.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	22.00 to 23.00
Argentine, lb.	19.75 to 20.00
China Clay—	
Domestic Filler	
Bulk (mine) ton	10.00 to 15.00
Domestic Coating	
Bulk (mine) ton	15.00 to 25.00
Imported (ship side)	
Bulk (lump) ton	22.00 to 30.00
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Tank cars (wks) cwt.	2.80 to 3.05
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	.24¾ to .25¼
Litharge, powd. bbl. lb.	.13¾ to .14¼
Rosin (Gum)—	New York, per 100 lbs.
E	5.90—
F	5.90—
G	6.10—
WW	6.25—
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Solid drums, cwt..... 3.15 to 3.25
Ground and flake, drums, cwt..... 3.55 to 3.60

Sodium Silicate—
60 deg. 55 gal. drums, (works) cwt..... 1.35 to 1.45
49 deg. 35 gal. drums, (works), cwt..... 1.05 to 1.20

Starch—
Pearl, 140-lb. bags, cwt... 4.87—
Pearl, barrels, cwt..... 4.87—
Paper, (Sp.) bags, cwt..... 4.87—
Powdered, barrels, cwt..... 4.98—

Sulphur (Crude)
(Mine) bulk, long ton..... 18.00—

Talc—
Dom. 100 lb. bags (mine) ton ..... 22.00 to 28.00
Canadian ..... 35.00 to 45.00

Titanium Dioxide—
Barium Pig. bbls., lb..... .19½ to .21½
Calcium Pig. bbls., lb..... .19& to .21½

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Chip, tube and can	75.00—
Chip, full blending	77.50—
Chip, sgl. mla. lined	77.50—
Coated, white patent	
.016	110.00—
.020 and heavier	100.00—
Kraft liner	95.00 to 100.00
Filled News	72.50—
Container	85.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)
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Book, White (M. F.)—	
A Grade E. F.	15.65—
B Grade E.F.	14.90—
A Grade S. C.	15.90—
B Grade S. C.	15.40—
No. 2 Uncoated Offset 4 sides, White	—
Machine Coated White (Trimmed 4 sides)	
No. 1 Glossy	19.75—
No. 2 Glossy	19.25—
No. 3 Glossy	17.75—
No. 4 Glossy	—
No. 2 Offset	15.15—
C1S Litho (Varnish)	—
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Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

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(In Ton Lots)

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100% Rag	47.05—
75% Rag	35.15—
50% Rag	29.40—
25% Rag	25.75—

Rag Content Ledger—
(In Ton Lots)

	per cwt.
Extra 100% Rag	55.70—
100% Rag	48.30—
75% Rag	37.65—
50% Rag	30.70—
25% Rag	27.15—

Sulphite Bond—

	per cwt.
Air dry, watermarked	—
No. 1 watermarked	17.70—
No. 2 watermarked	16.75—
No. 4 watermarked	15.75—

Sulphite Ledger—

	per cwt.
No. 1 watermarked	19.00—
No. 2 watermarked	18.20—
No. 4 watermarked	17.65—

Glassine (f.o.b. mill)—

	per cwt.
Embossed (25 lb. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof—	
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—

News—

	per ton
Rolls, Standard Contract)	100.00 to 105.00
Rolls (Spot)	(Nominal)
Sheets	110.00—

Tissues (Carlots)—

	per ream
White No. 1	1.55—
White No. 2	1.20—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.37½—
Manila	1.60—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.80—
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.80—
Toilet, Bleached (M. shts.) per cs.	6.95—
Toilet, Unbleached (M. shts.) per cs.	5.75—

Towels—

	per case
Bleached	5.25—
Unbleached	4.50—

Wrappings (Kraft)—

	per cwt.
Super-Standard	8.00 to 8.50
No. 1 Wrapping	7.25 to 7.50
Standard Wrapping	6.50 to 6.75
Standard Bag	6.25 to 6.50
Variety Bag	—

Wrappings (Sulphite and Bleached Kraft)—
(Rolls, f.o.b. mill)

Bleached Papers—

	per cwt.
M.F. & M.G. Waxing, 30 lb. (Carloads only)	—
(10,000 lb.)	—
Drug wrapp., 35 lb.	—

Unbleached Papers—

Com. Gr. Butch. 40 lb.	—
No. 1 Butchers	—
No. 1 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
No. 2 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
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Manilas—

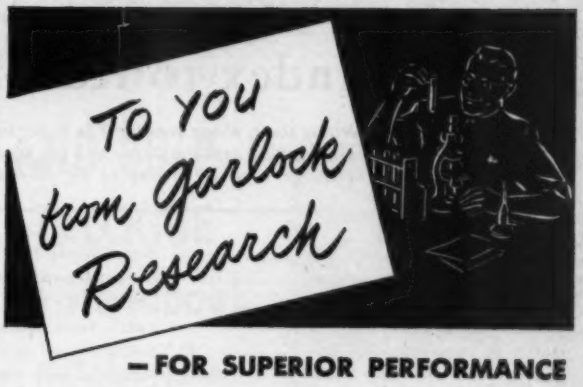
Envp. Mla., Sub. 16-40 (No. 1)	—
Envp. Mla., Sub. 16-28 (No. 2)	—
Envp. Mla. (Prices based on large sheets untrim'd ream marked, in bdls.)	—

Wrapp Mla. 25 lb. up—

No. 1	—
No. 2	—

M.G. Sulphite and Kraft (other than Waxing)

Grade B30 lb.	—
Grade A-22 lb.	—



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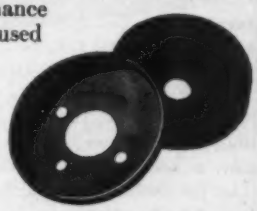

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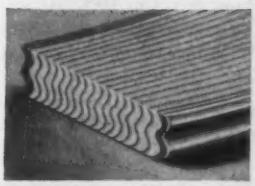

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GARLOCK *Chevron** Packing—an automatic packing made of asbestos or cotton base materials—accurately molded into rings of any size. Chevron packs high pressure jobs or low pressure jobs with minimum friction and wear.

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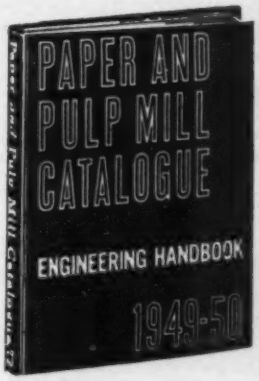

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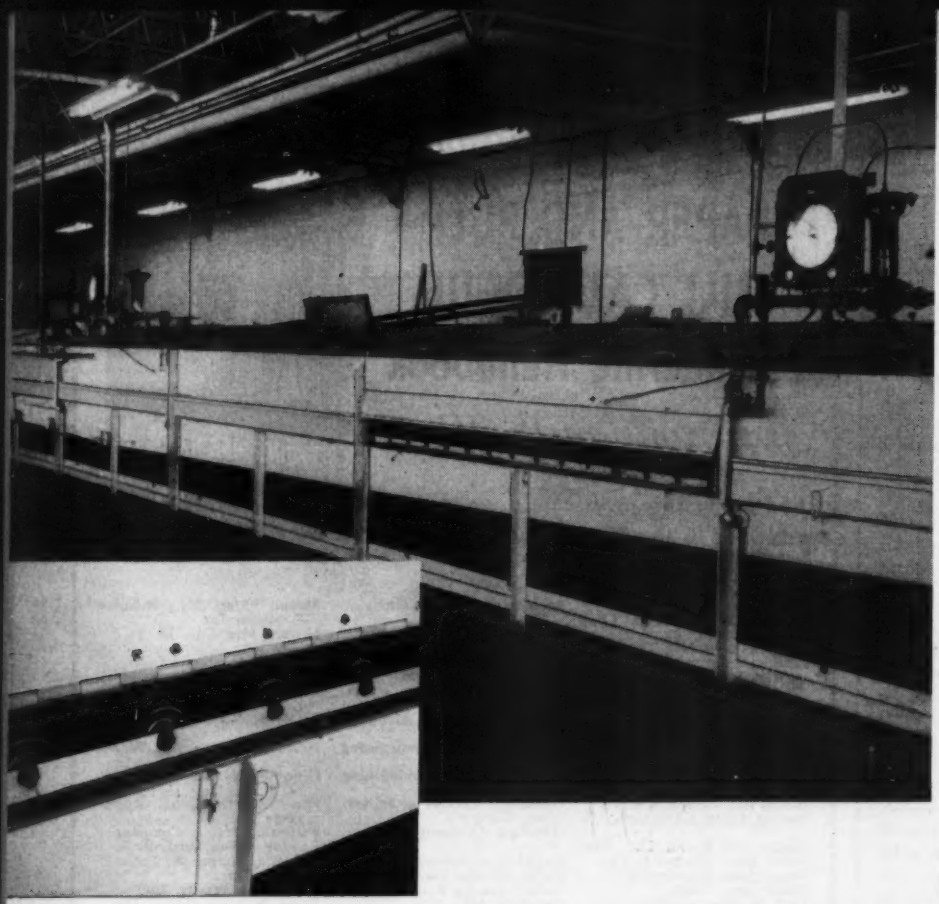

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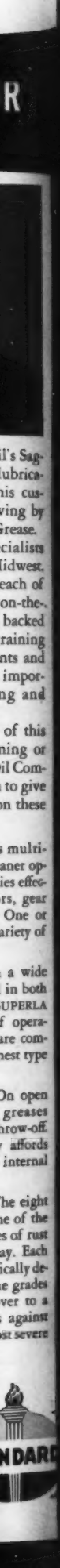

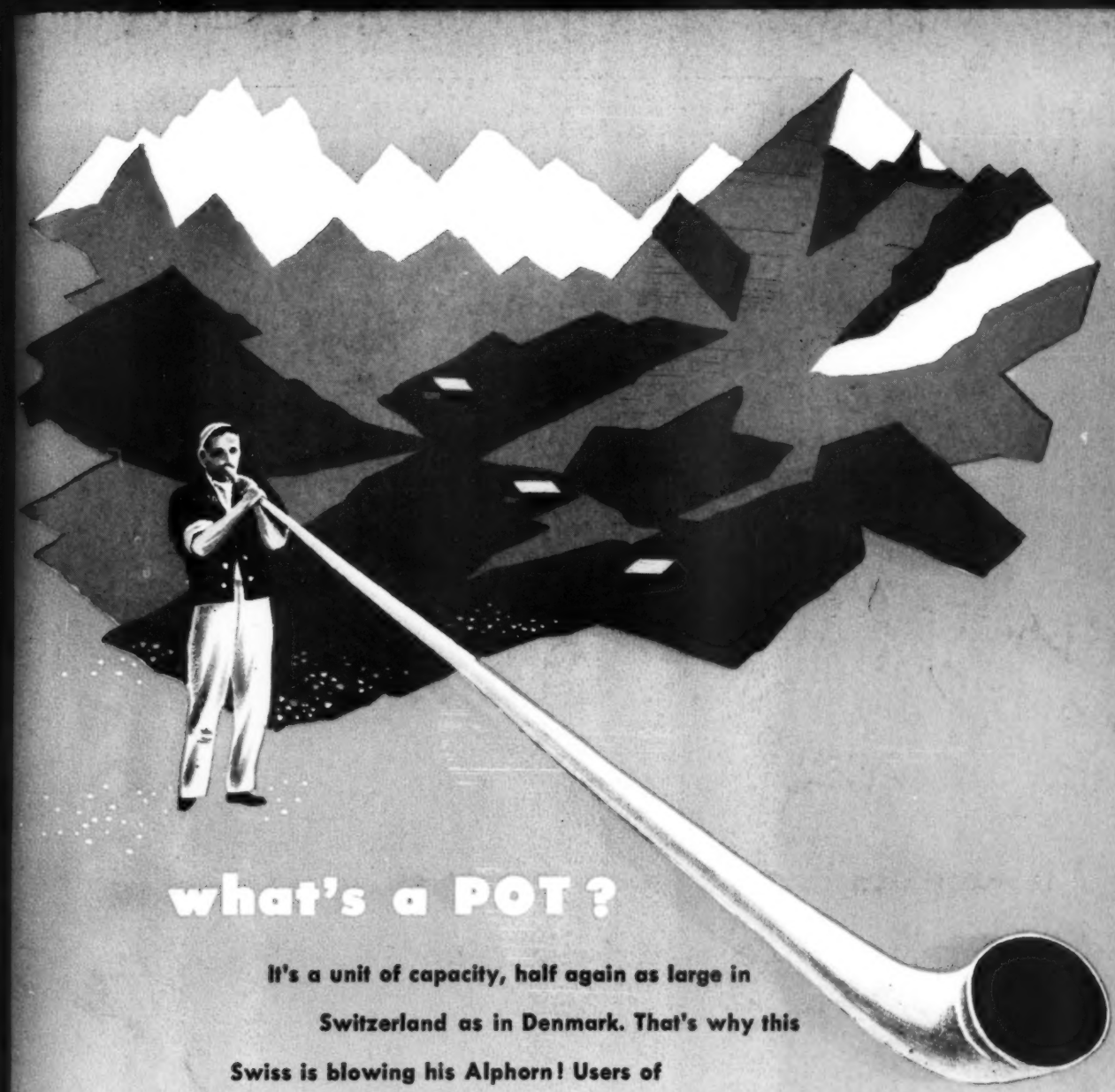

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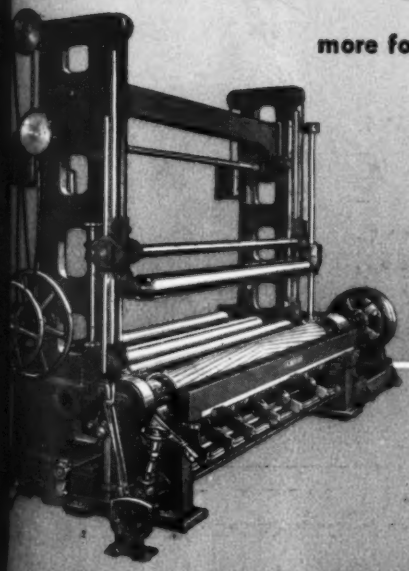

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